FCC TEST REPORT

REPORT NO.: RF921102A01B

MODEL NO.: HC02U (with Bluetooth Module)

RECEIVED: Nov. 2, 2003

TESTED: Nov. 13 ~ 15, 2003

APPLICANT: Wistron Corporation

ADDRESS: 21F, 88, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

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Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT:	Personal Digital Assistant
BRAND NAME:	Dell
MODEL NO:	HC02U (with Bluetooth Module)
TEST ITEM:	ENGINEERING SAMPLE
APPLICANT:	Wistron Corporation
STANDARDS:	47 CFR Part 15, Subpart C (Section 15.247) ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample the designation has been tested in our facility from Oct. 28 ~ Nov. 20, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY: _____ , **DATE:** Nov. 26, 2003
(Yemmy Soong)

APPROVED BY: _____ , **DATE:** Nov. 26, 2003
(Mike Su, Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is –11.57dB at 0.181MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec.: Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec.: Min. 25kHz or 20dB bandwidth	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Limit: max. 1MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –14.89dB at 801.25MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit

Note: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Personal Digital Assistant
MODEL NO.	HC02U (with Bluetooth Module)
SOURCE VOLTAGE	V_{nom}= 230 V_{min}= 207 V_{max}= 253
POWER SUPPLY	5.4Vdc from power adapter
MODULATION TYPE	FHSS: GFSK
TRANSFER RATE	723Kbps
FREQUENCY RANGE	2.402GHz ~ 2.480GHz
NUMBER OF CHANNEL	79
OUTPUT POWER	3.50dBm
ANTENNA TYPE	One Hirose W.FL –R-SMT(10) RF connector Peak gain: 3.19dBi
TEMPERATURE RANGE	-30℃ ~ +70℃
DATA CABLE	NA
I/O PORTS	Earphone port, DC in port, SD slot, Cradle connection port, Int. microphone
ASSOCIATED DEVICES	Charging adapter

NOTE:

1. The EUT is a PDA with a Bluetooth module - brand: Dell, model: Dell TM310 Bluetooth Module. (Manufacturer for the module is USI, model: WM-BBT-AG-01 single module)

2. The EUT has two types of power adapters with the following specification:

Brand: Dell Model: PA-14 Family (Delta, model: ADP-13CB A)	Input rating: 100-240V, 0.4A 50/60Hz; Output rating: 5.4Vdc, 2.41A.
Brand: Dell Model: PA-14 Family (Lite-On, model: PA-1130-01WD)	Input rating: 100-240V, 0.4A 50/60Hz; Output rating: 5.4Vdc, 2.41A.

3. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

The EUT was pre-tested with the following condition:

1. Two types of power adapters were pre-tested. For **Conducted test**, both power adapters were tested and the test data was recorded separately in this report.
   Test result A – the EUT was tested with Dell, model: PA-14 Family (Delta, model: ADP-13CB A)
   Test result B - the EUT was tested with Dell, model: PA-14 Family (Lite-On, model: PA-1130-01WD)
   The worst configuration between the two modes was used as the final test for all other test items. The worst configuration was found when the EUT was tested with Dell, model: PA-14 Family (Lite-On, model: PA-1130-01WD).
2. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane. Therefore only the test data of this X-plane was used for **Radiated test**.

Seventy-nine channels were provided to the EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476

15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

NOTE:

1. Below 1GHz, the channel 0, 39, and 78 were pre-tested in chamber. The channel 78, the worst case, was chosen for final test.
2. Above 1GHz, the channel 0, 39, and 78 were tested individually.

3.3 DESCRIPTION OF APPLIED STANDARDS

The EUT is a Personal Digital Assistant with a bluetooth module installed, according to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 15, Subpart C. (15.247)
ANSI C63.4: 1992

All tests have been performed and recorded as per the above standards.

NOTE:
The EUT is also considered as a kind of computer peripheral. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with its power adapter.

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Jan. 20, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 18, 2003
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 29, 2003
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 29, 2003
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May. 01, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. "*": These equipment are used for conducted telecom port test only (if tested).
3. The test was performed in ADT Shielded Room No. 10.
4. The VCCI Site Registration No. is C-1312.

4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

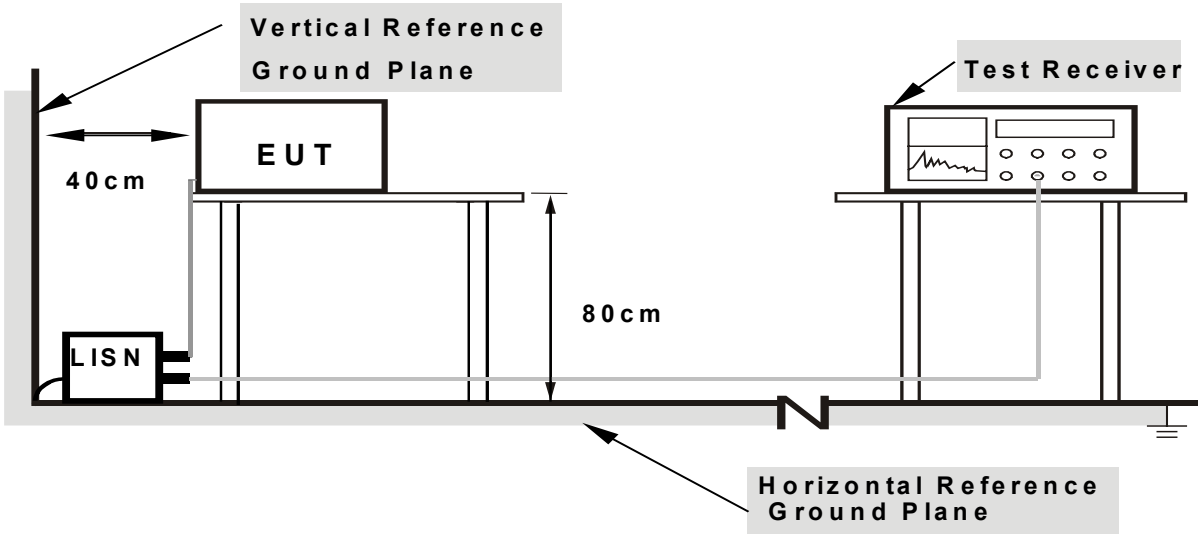
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

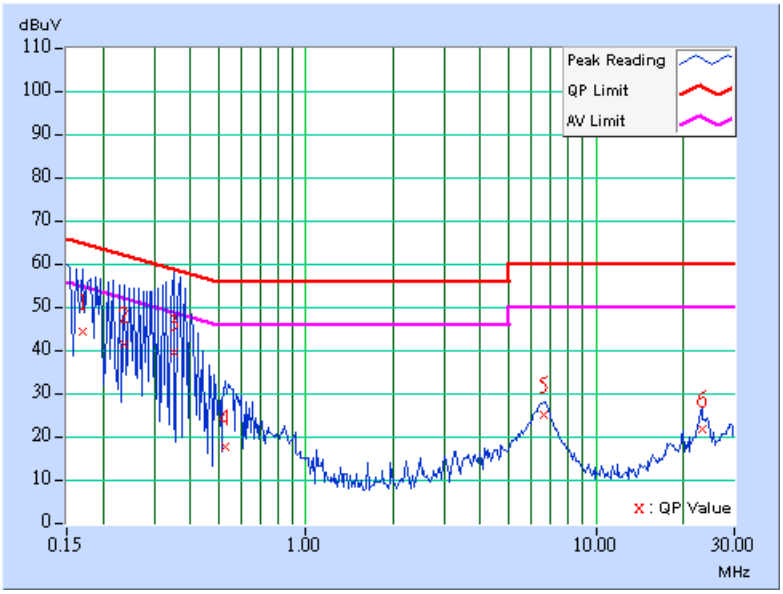
The EUT ran a test program to enable it to transmit/receive continuously at specific channel frequency.

4.1.7 TEST RESULTS (A)

EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 0	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.170	0.06	43.52	-	43.58	-	64.98	54.98	-21.41	-
2	0.236	0.06	40.52	-	40.58	-	62.24	52.24	-21.66	-
3	0.349	0.06	38.72	-	38.78	-	58.98	48.98	-20.20	-
4	0.525	0.08	17.14	-	17.22	-	56.00	46.00	-38.78	-
5	6.605	0.31	24.48	-	24.79	-	60.00	50.00	-35.21	-
6	23.176	0.80	21.22	-	22.02	-	60.00	50.00	-37.98	-

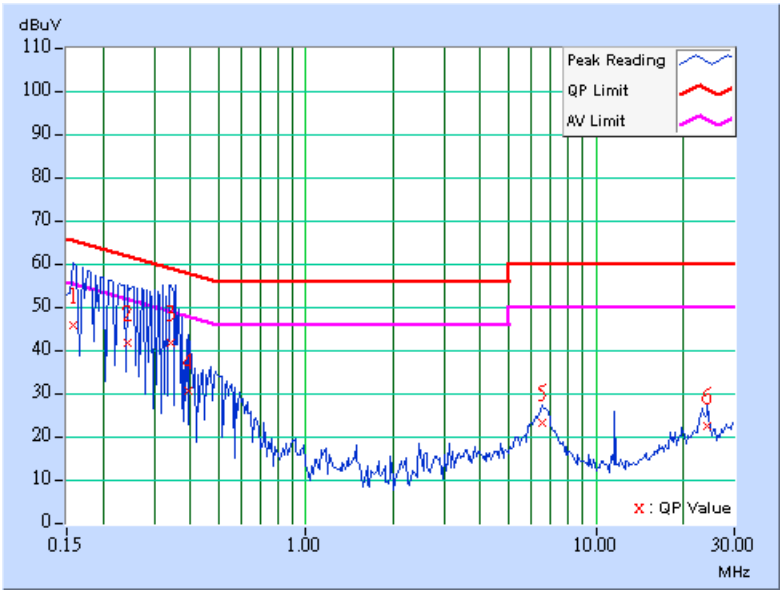
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 0	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.05	45.31	-	45.36	-	65.58	55.58	-20.22	-
2	0.244	0.05	40.98	-	41.03	-	61.97	51.97	-20.94	-
3	0.341	0.05	41.22	-	41.27	-	59.17	49.17	-17.90	-
4	0.396	0.05	29.90	-	29.95	-	57.93	47.93	-27.98	-
5	6.531	0.28	22.51	-	22.79	-	60.00	50.00	-37.21	-
6	24.313	0.70	21.93	-	22.63	-	60.00	50.00	-37.37	-

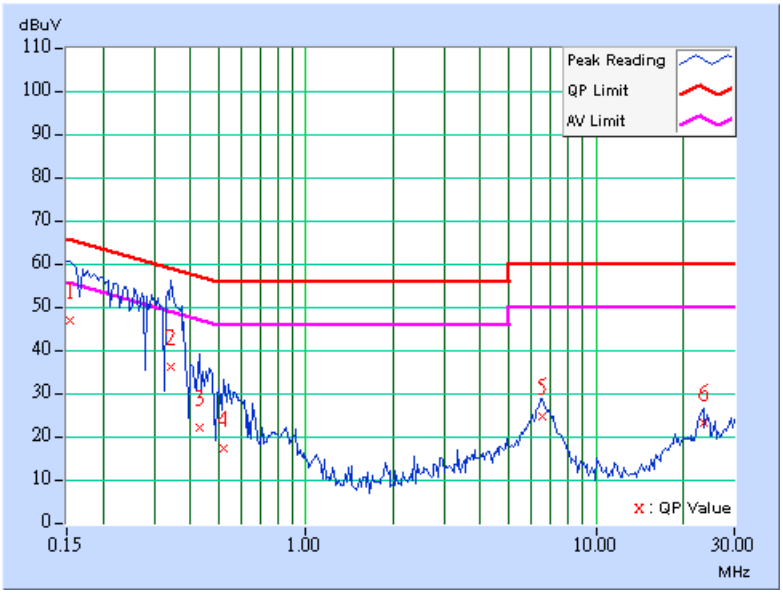
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 39	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.06	46.35	-	46.41	-	65.79	55.79	-19.38	-
2	0.341	0.06	35.48	-	35.54	-	59.17	49.17	-23.63	-
3	0.431	0.07	21.32	-	21.39	-	57.23	47.23	-35.84	-
4	0.521	0.08	16.41	-	16.49	-	56.00	46.00	-39.51	-
5	6.508	0.30	23.91	-	24.21	-	60.00	50.00	-35.79	-
6	23.473	0.81	22.55	-	23.36	-	60.00	50.00	-36.64	-

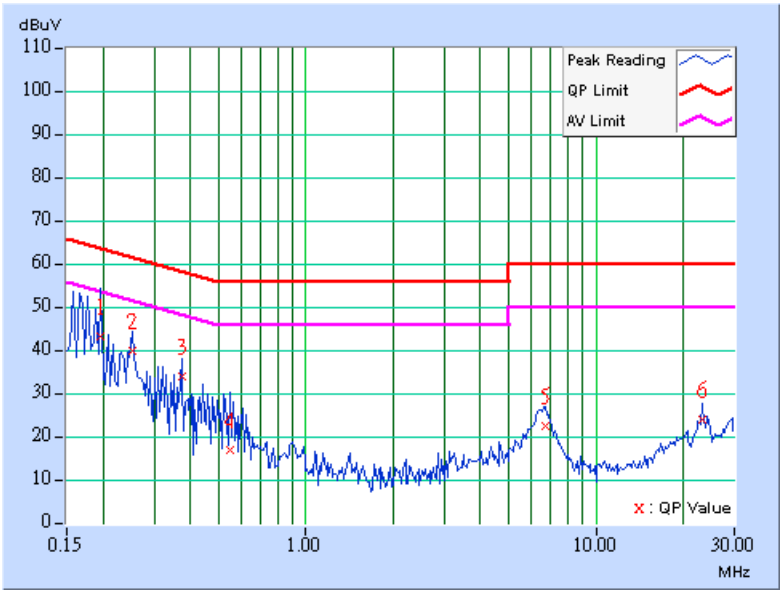
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 39	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.05	42.76	-	42.81	-	63.74	53.74	-20.93	-
2	0.252	0.05	39.36	-	39.41	-	61.71	51.71	-22.30	-
3	0.373	0.05	33.51	-	33.56	-	58.44	48.44	-24.88	-
4	0.548	0.08	16.37	-	16.45	-	56.00	46.00	-39.55	-
5	6.691	0.29	22.12	-	22.41	-	60.00	50.00	-37.59	-
6	23.172	0.65	23.60	-	24.25	-	60.00	50.00	-35.75	-

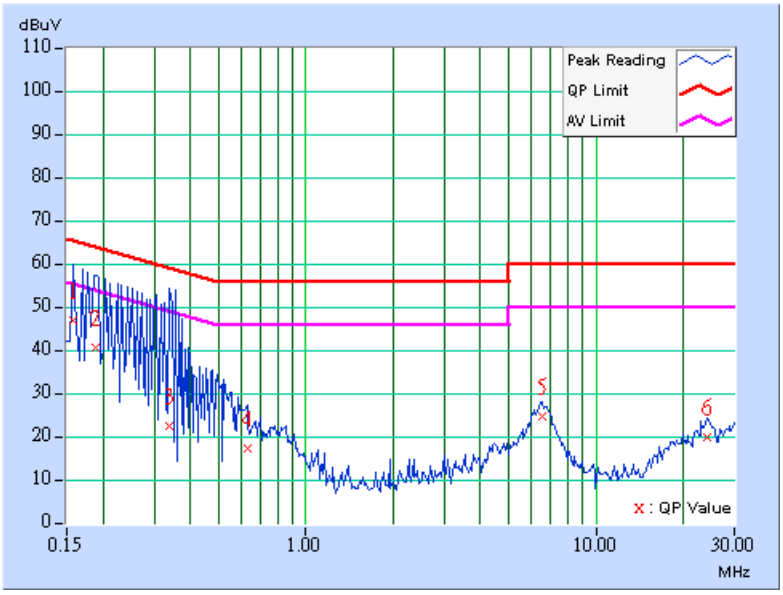
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.158	0.06	46.04	-	46.10	-	65.58	55.58	-19.48	-
2	0.189	0.06	39.94	-	40.00	-	64.08	54.08	-24.08	-
3	0.338	0.06	21.75	-	21.81	-	59.26	49.26	-37.45	-
4	0.627	0.10	16.53	-	16.63	-	56.00	46.00	-39.37	-
5	6.508	0.30	23.97	-	24.27	-	60.00	50.00	-35.73	-
6	24.129	0.85	19.07	-	19.92	-	60.00	50.00	-40.08	-

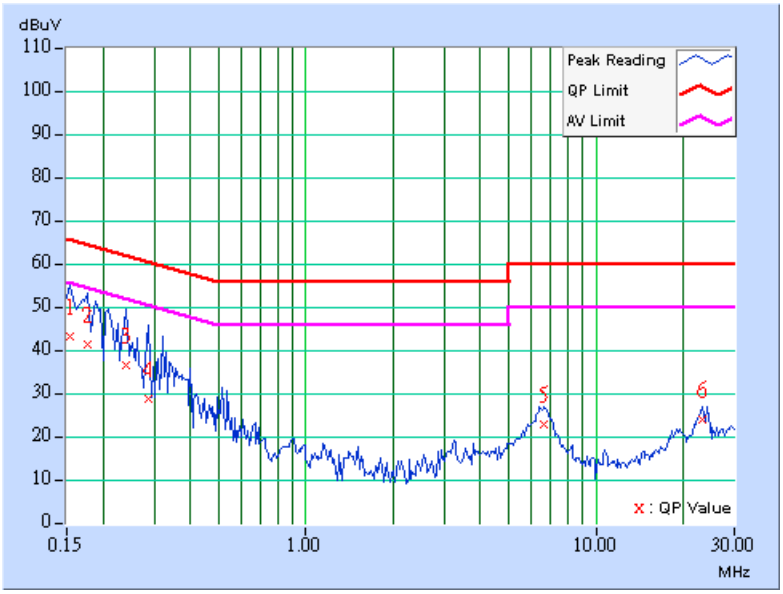
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.154	0.05	42.80	-	42.85	-	65.79	55.79	-22.94	-
2	0.177	0.05	40.69	-	40.74	-	64.61	54.61	-23.87	-
3	0.240	0.05	36.20	-	36.25	-	62.10	52.10	-25.85	-
4	0.287	0.05	28.26	-	28.31	-	60.62	50.62	-32.31	-
5	6.648	0.29	22.36	-	22.65	-	60.00	50.00	-37.35	-
6	23.172	0.65	23.38	-	24.03	-	60.00	50.00	-35.97	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

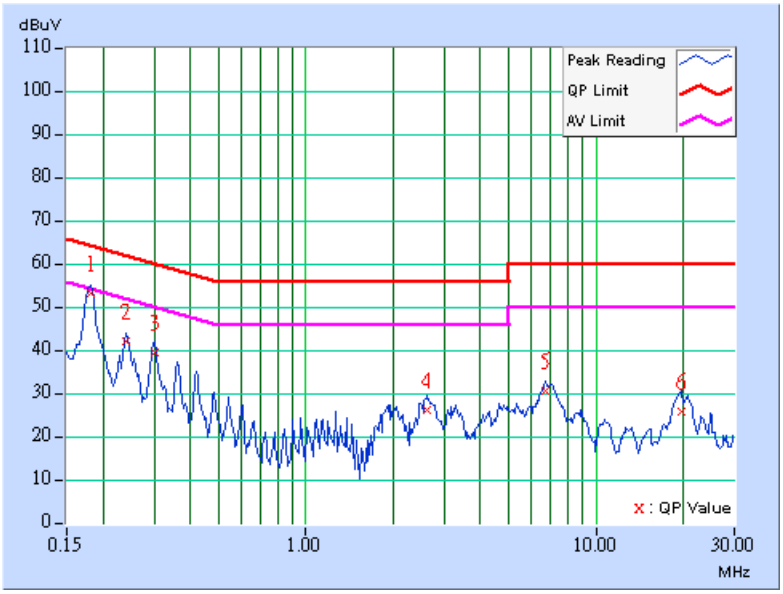


4.1.8 TEST RESULTS (B)

EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 0	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.06	52.80	-	52.86	-	64.43	54.43	-11.57	-
2	0.240	0.06	41.61	-	41.67	-	62.10	52.10	-20.43	-
3	0.302	0.06	38.88	-	38.94	-	60.18	50.18	-21.24	-
4	2.625	0.19	25.66	-	25.85	-	56.00	46.00	-30.15	-
5	6.680	0.31	29.96	-	30.27	-	60.00	50.00	-29.73	-
6	19.734	0.64	25.24	-	25.88	-	60.00	50.00	-34.12	-

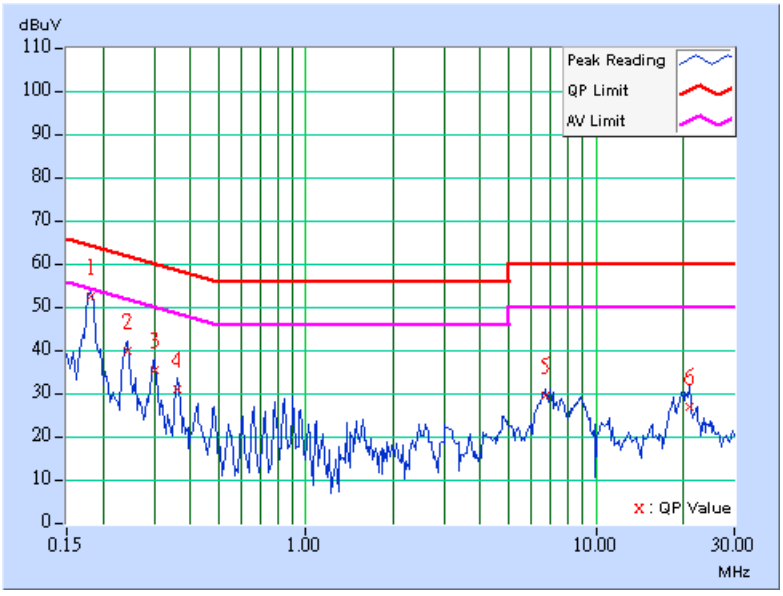
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 0	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.05	52.02	-	52.07	-	64.43	54.43	-12.36	-
2	0.244	0.05	39.27	-	39.32	-	61.97	51.97	-22.65	-
3	0.302	0.05	35.14	-	35.19	-	60.18	50.18	-24.99	-
4	0.361	0.05	30.67	-	30.72	-	58.71	48.71	-27.99	-
5	6.738	0.29	29.14	-	29.43	-	60.00	50.00	-30.57	-
6	20.930	0.55	26.62	-	27.17	-	60.00	50.00	-32.83	-

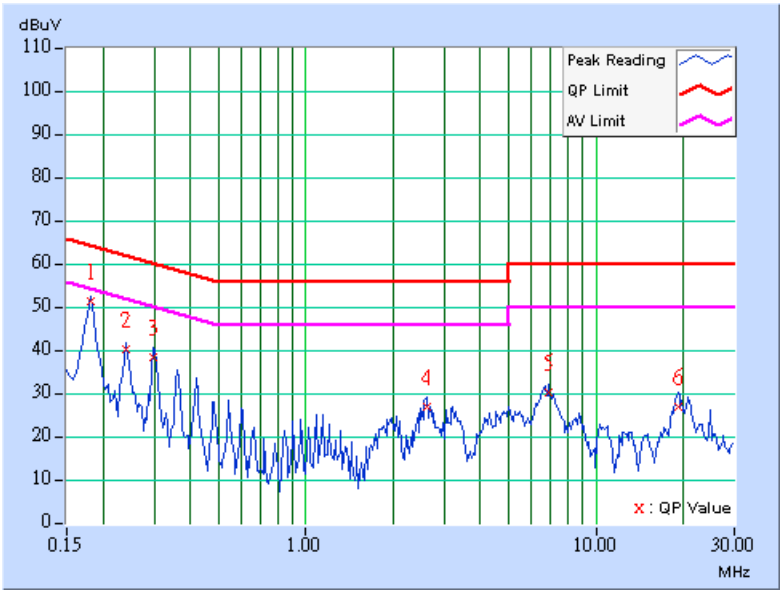
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 38	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.06	50.98	-	51.04	-	64.43	54.43	-13.39	-
2	0.240	0.06	39.59	-	39.65	-	62.10	52.10	-22.45	-
3	0.298	0.06	37.87	-	37.93	-	60.29	50.29	-22.36	-
4	2.621	0.19	26.34	-	26.53	-	56.00	46.00	-29.47	-
5	6.855	0.31	29.69	-	30.00	-	60.00	50.00	-30.00	-
6	19.121	0.63	26.53	-	27.16	-	60.00	50.00	-32.84	-

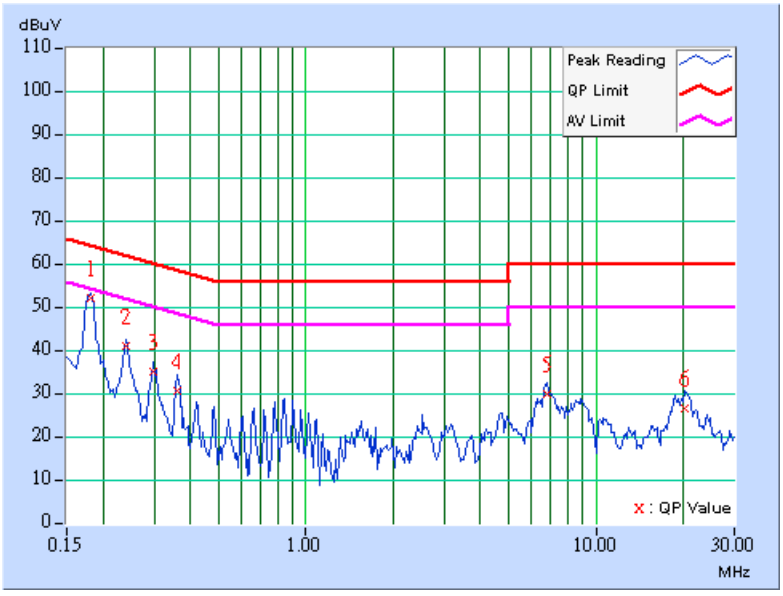
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 38	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.05	51.63	-	51.68	-	64.43	54.43	-12.75	-
2	0.240	0.05	40.42	-	40.47	-	62.10	52.10	-21.63	-
3	0.298	0.05	34.50	-	34.55	-	60.29	50.29	-25.74	-
4	0.361	0.05	30.12	-	30.17	-	58.71	48.71	-28.54	-
5	6.797	0.29	29.63	-	29.92	-	60.00	50.00	-30.08	-
6	20.324	0.52	26.03	-	26.55	-	60.00	50.00	-33.45	-

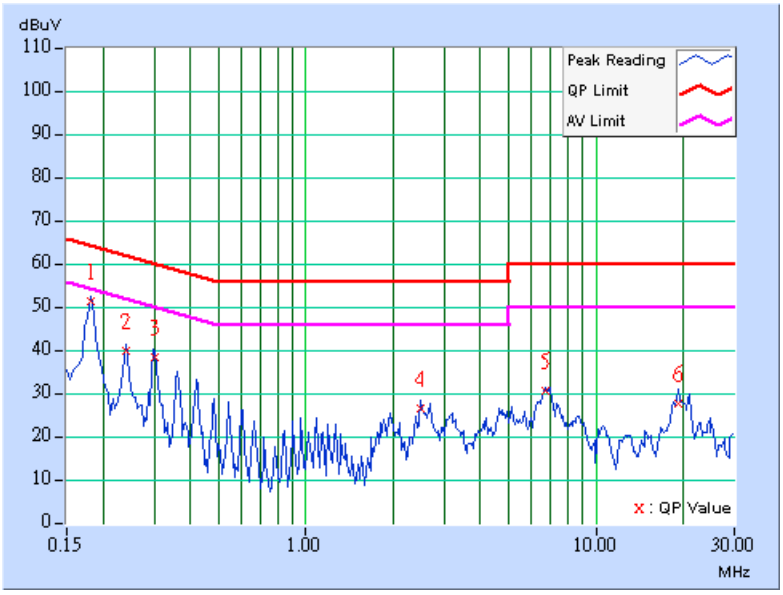
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.06	50.70	-	50.76	-	64.43	54.43	-13.67	-
2	0.240	0.06	39.33	-	39.39	-	62.10	52.10	-22.71	-
3	0.302	0.06	37.99	-	38.05	-	60.18	50.18	-22.13	-
4	2.500	0.19	25.98	-	26.17	-	56.00	46.00	-29.83	-
5	6.676	0.31	30.01	-	30.32	-	60.00	50.00	-29.68	-
6	19.184	0.63	27.15	-	27.78	-	60.00	50.00	-32.22	-

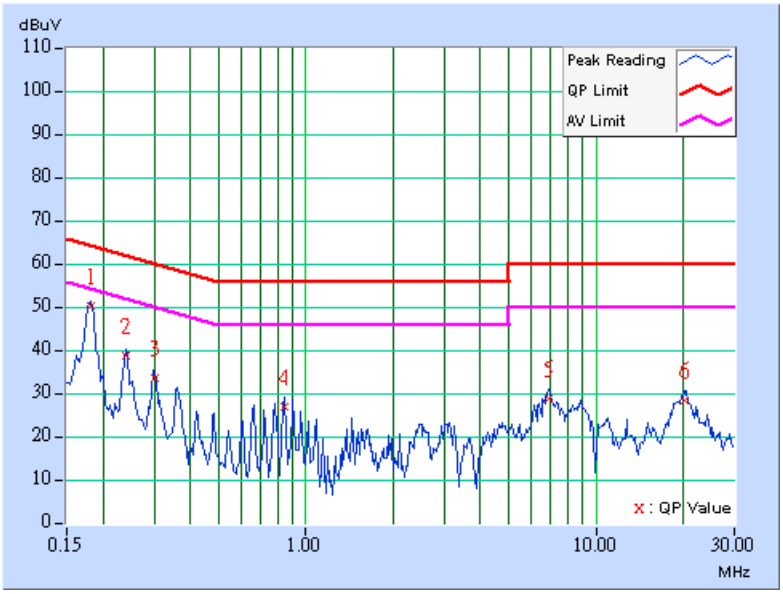
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**6dB BANDWIDTH**	9kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 70% RH, 1005 hPa	**TESTED BY**: Jamison Chan	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.181	0.05	49.84	-	49.89	-	64.43	54.43	-14.54	-
2	0.240	0.05	38.38	-	38.43	-	62.10	52.10	-23.67	-
3	0.302	0.05	33.18	-	33.23	-	60.18	50.18	-26.95	-
4	0.841	0.13	26.35	-	26.48	-	56.00	46.00	-29.52	-
5	6.855	0.29	28.40	-	28.69	-	60.00	50.00	-31.31	-
6	20.328	0.52	28.15	-	28.67	-	60.00	50.00	-31.33	-

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMITS OF HOPPING FREQUENCY USED

At least 15 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.

d. Set the SA on View mode and then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

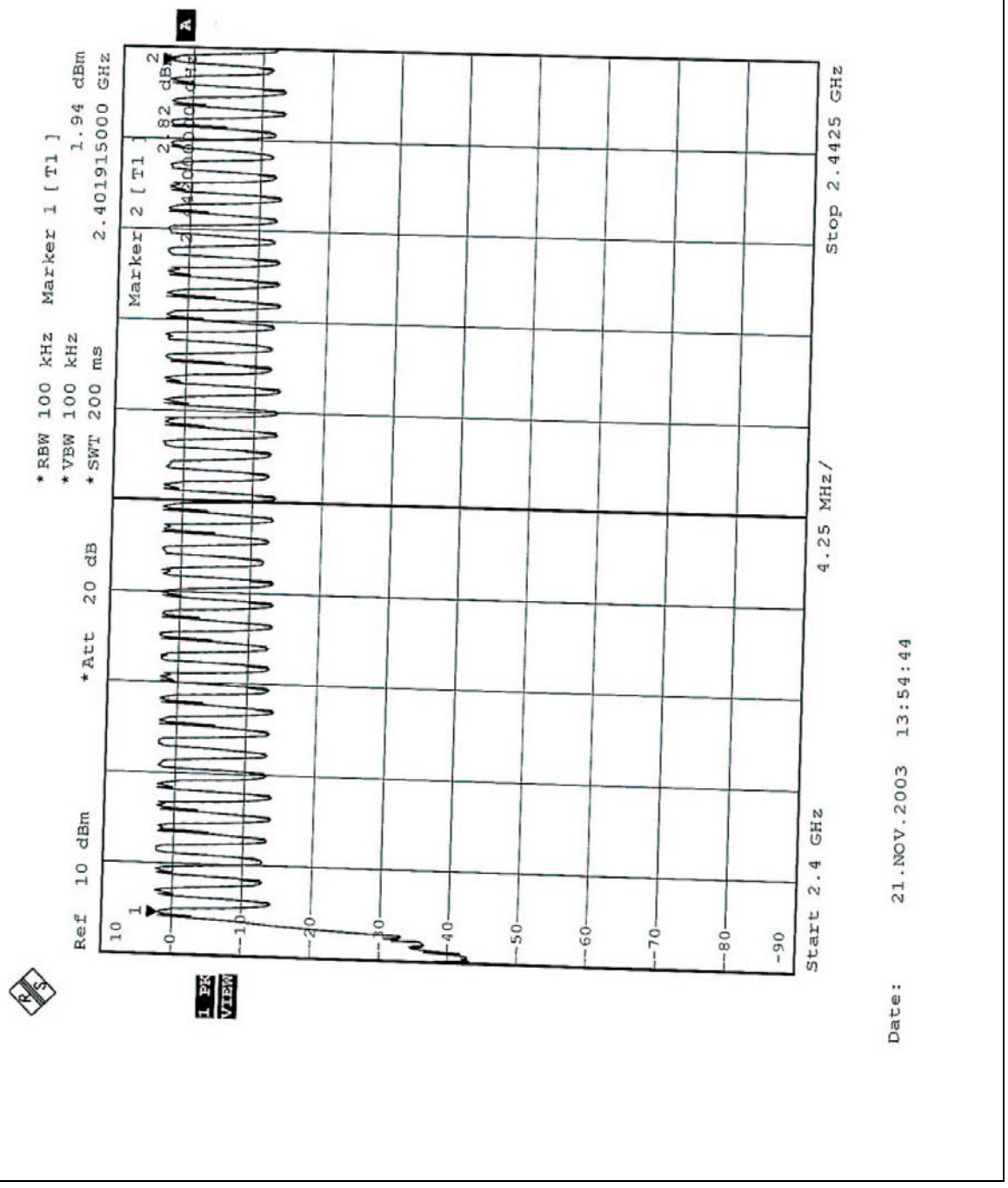
4.2.5 TEST SETUP

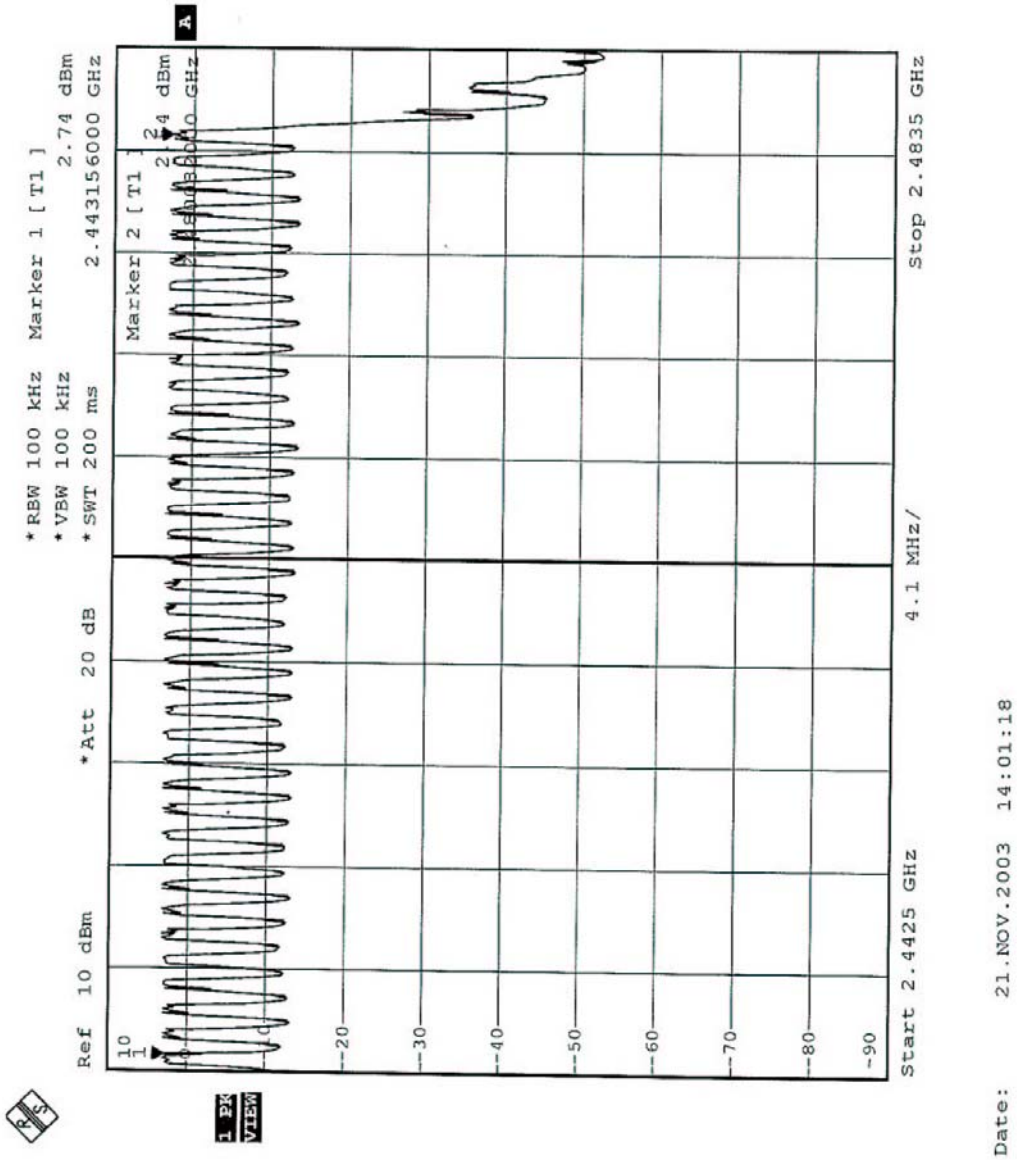
For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that hopping frequencies are equally spaced.

CH1


*RBW 100 kHz
*VBW 100 kHz
*SWT 200 ms
Marker 1 [T1]
1.94 dBm
2.401915000 GHz
Marker 2 [T1]
2.82 dBm
Ref 10 dBm
*Att 20 dB
Start 2.4 GHz
4.25 MHz/
Stop 2.4425 GHz
Date: 21.NOV.2003 13:54:44


*RBW 100 kHz
*VBW 100 kHz
*SWT 200 ms
Marker 1 [T1]
2.74 dBm
2.44315000 GHz
Marker 2 [T1]
2.24 dBm
2.48800000 GHz
Ref 10 dBm
*Att 20 dB
Start 2.4425 GHz
4.1 MHz/
Stop 2.4835 GHz
1 PK
VIEW
Date: 21.NOV.2003 14:01:18

4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMITS OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.

c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.

d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

e. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

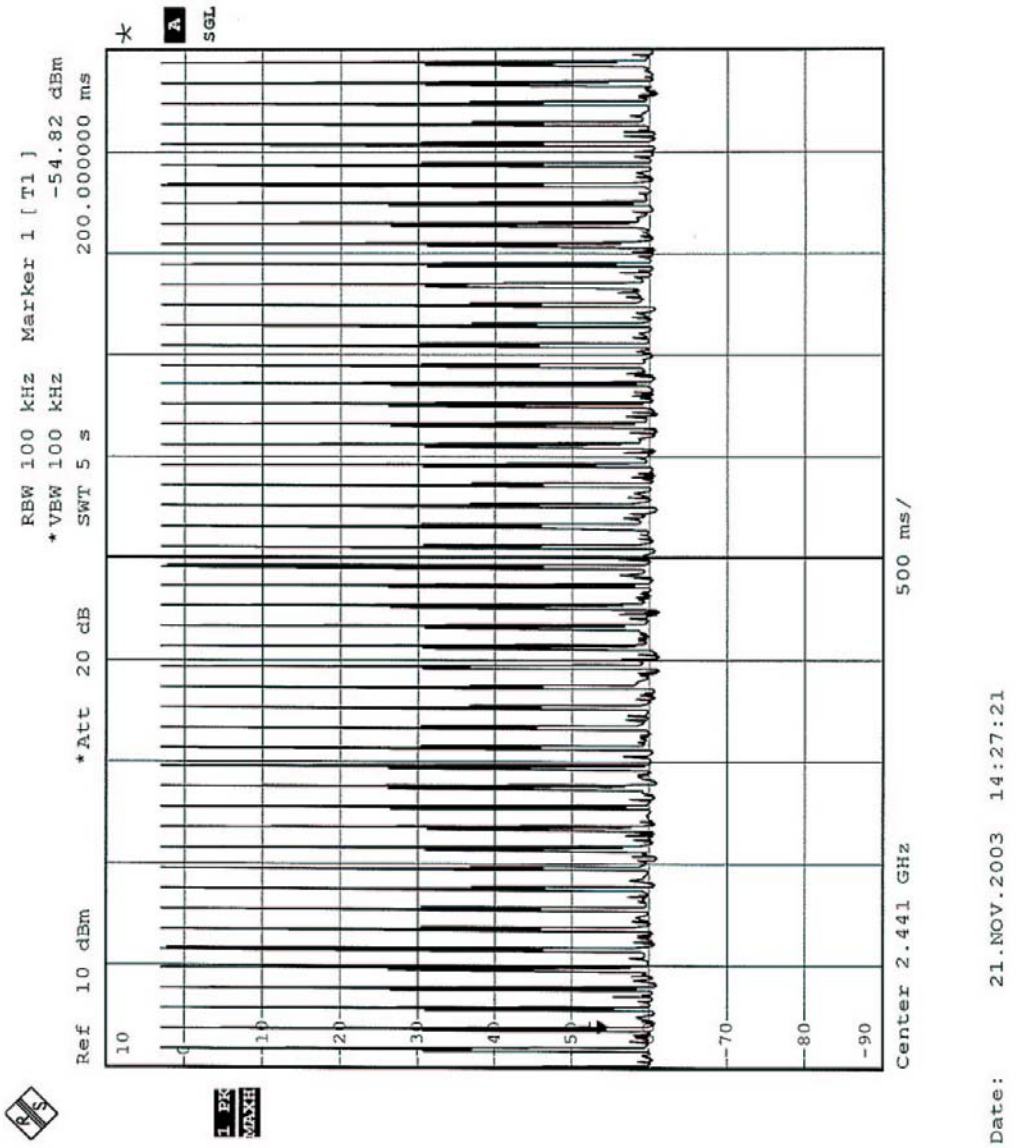
For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

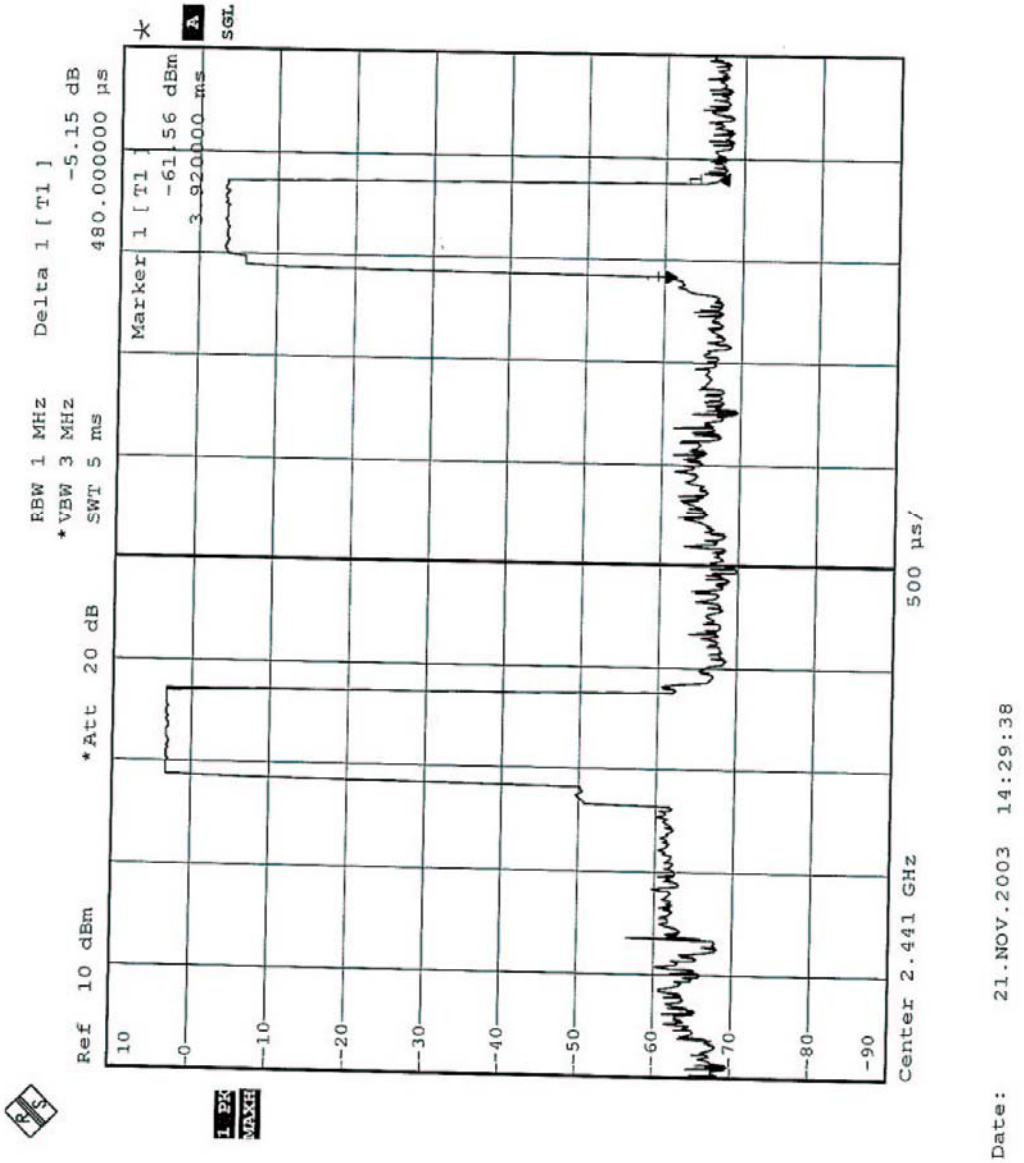
4.3.6 TEST RESULTS

Mode	No. of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	50 times / 5 sec *6.32= 316 times	0.48	151.68	400
DH3	25 times / 5 sec *6.32= 158 times	1.83	289.14	400
DH5	17 times / 5 sec *6.32= 108 times	3.10	334.80	400

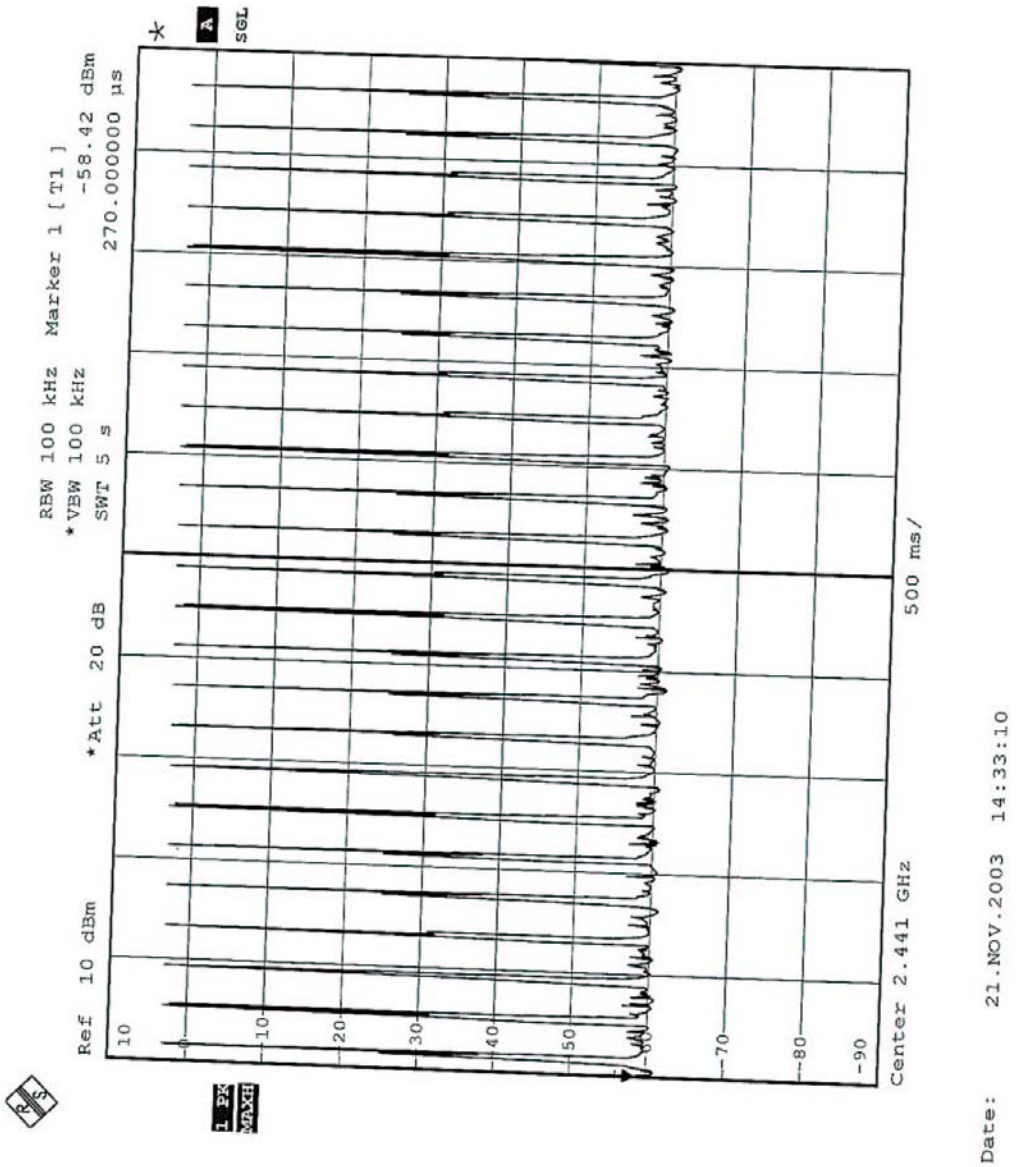
Test plots of the transmitting time slot are shown on next six pages.

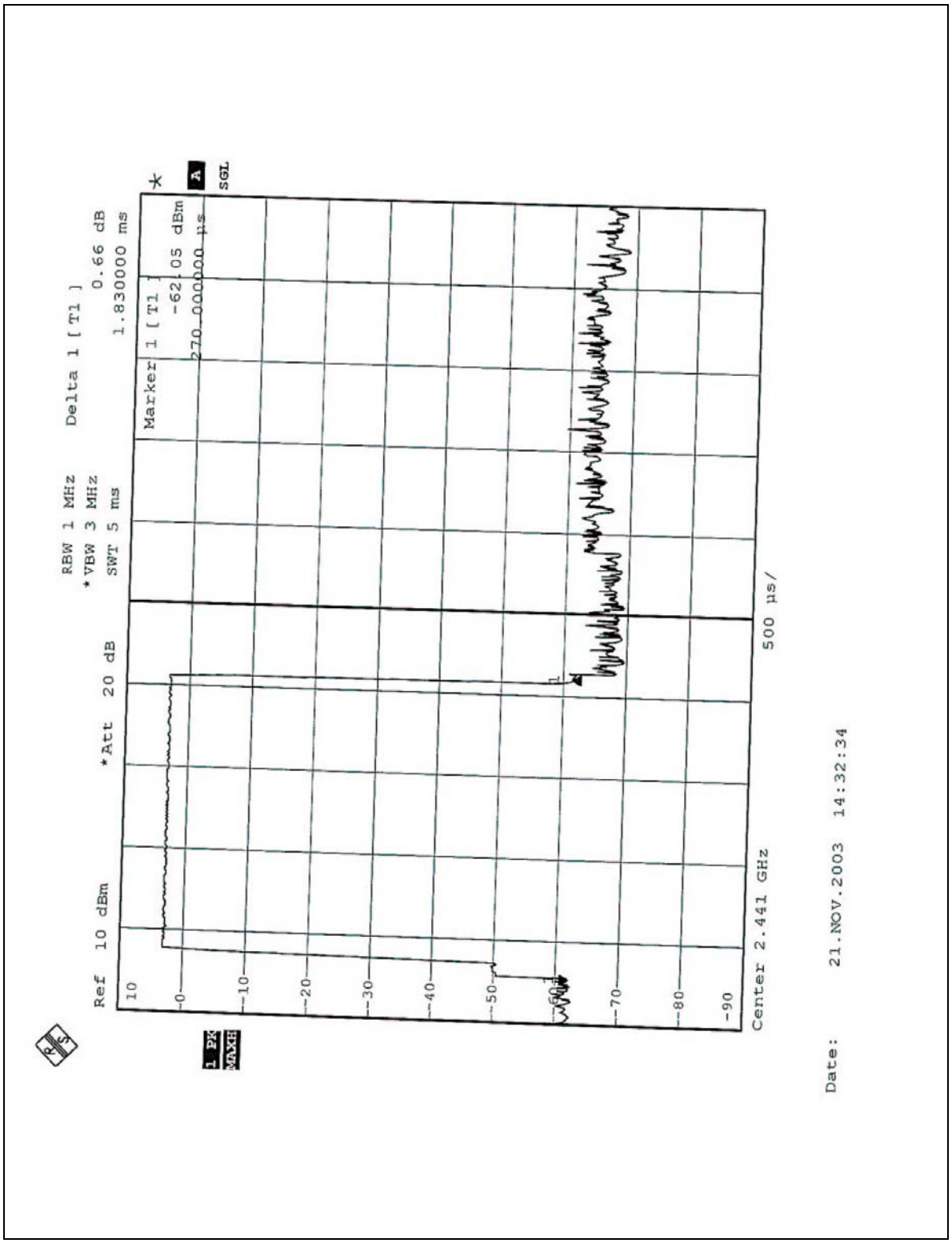
DH1


RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Marker 1 [T1]
-54.82 dBm
200.000000 ms
Ref 10 dBm
*Att 20 dB
SGL
1 PK
MAXH
Center 2.441 GHz
500 ms/
Date: 21.NOV.2003 14:27:21

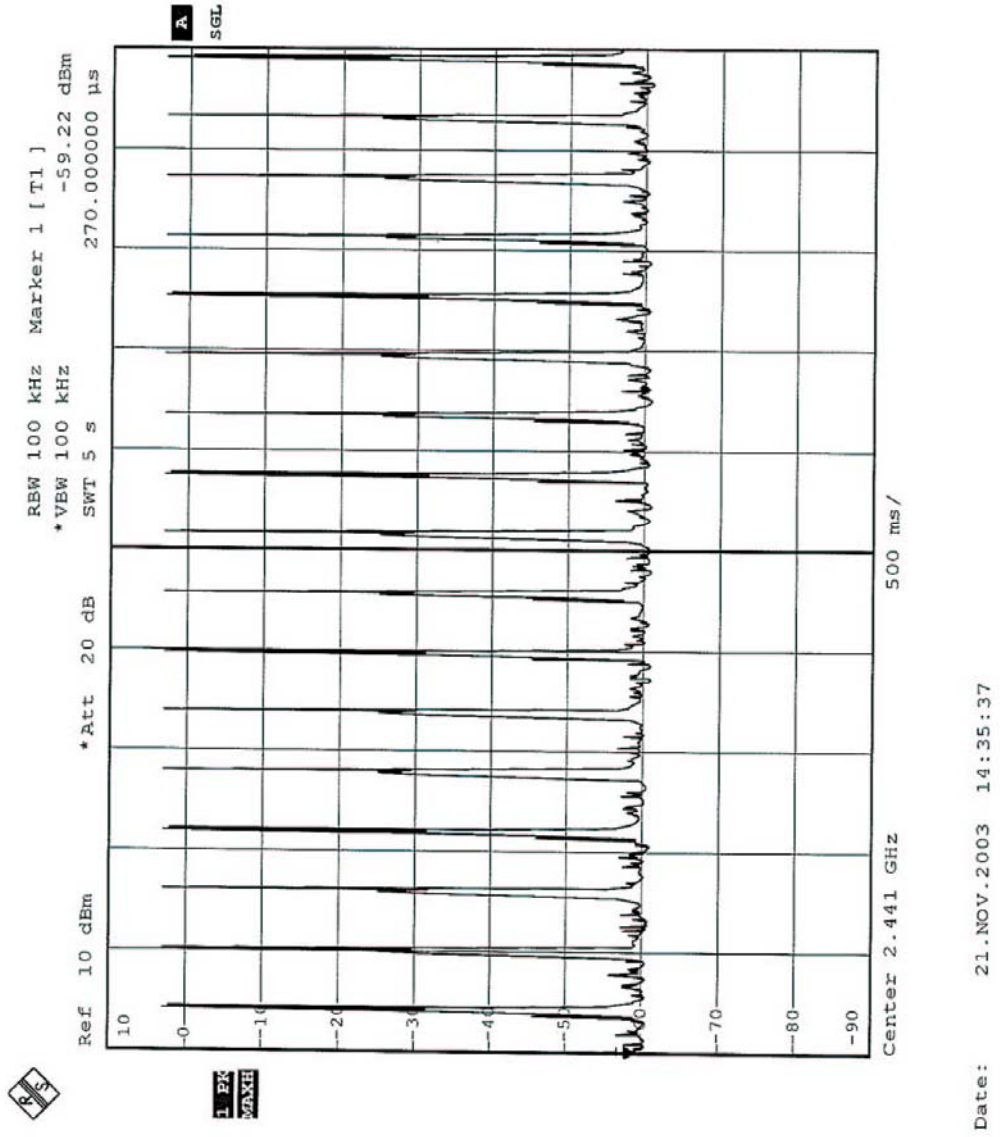

RBW 1 MHz
*VBW 3 MHz
SWT 5 ms
Delta 1 [T1]
-5.15 dB
480.000000 µs
Marker 1 [T1]
-61.56 dBm
3.920000 ms
SGL
Ref 10 dBm
*Att 20 dB
Center 2.441 GHz
500 µs/
1 PK MAXH
Date: 21.NOV.2003 14:29:38

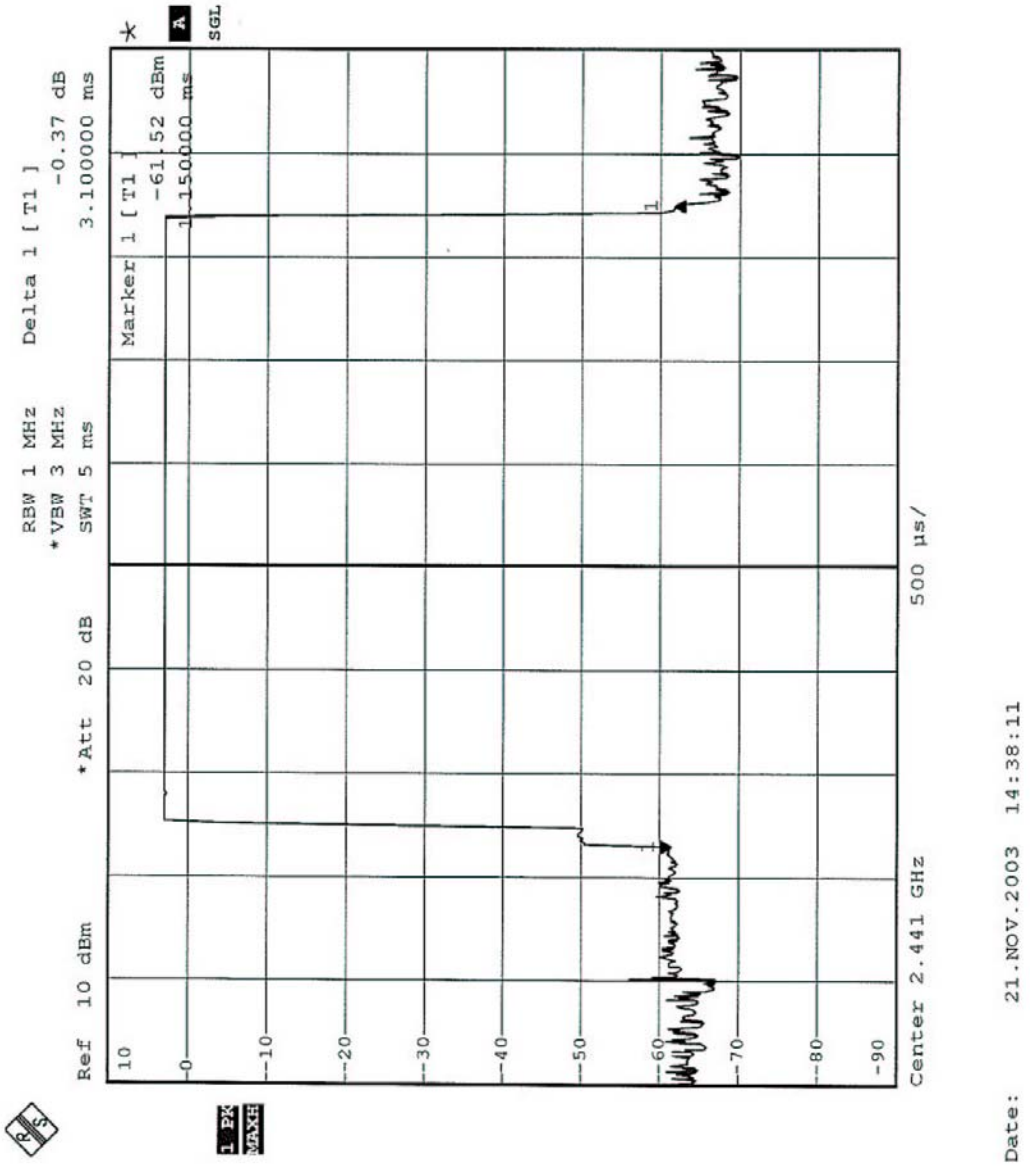
DH3


RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Marker 1 [T1]
-58.42 dBm
270.000000 µs
*Att 20 dB
Ref 10 dBm
Center 2.441 GHz
500 ms/
Date: 21.NOV.2003 14:33:10


Ref 10 dBm
*Att 20 dB
RBW 1 MHz
*VBW 3 MHz
SWT 5 ms
Delta 1 [T1]
0.66 dB
1.830000 ms
Marker 1 [T1]
-62.05 dBm
270.000000 µs
SGL
A
1 PK MAXH
Center 2.441 GHz
500 µs/
Date: 21.NOV.2003 14:32:34

DH5


A
SGL
RBW 100 kHz
*VBW 100 kHz
SWT 5 s
Marker 1 [T1]
-59.22 dBm
270.000000 µs
Ref 10 dBm
*Att 20 dB
1 PK
MAXH
Center 2.441 GHz
500 ms/
Date: 21.NOV.2003 14:35:37


RBW 1 MHz
*VBW 3 MHz
Ref 10 dBm
*Att 20 dB
SWT 5 ms
Delta 1 [T1]
-0.37 dB
3.100000 ms
Marker 1 [T1]
-61.52 dBm
1.150000 ms
SGL
1 PK MAXH
Center 2.441 GHz
500 µs/
Date: 21.NOV.2003 14:38:11

4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5 MHz and 5725-5850 MHz bands, the maximum 20 dB bandwidth of the hopping channel is 1MHz.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Repeat above procedure until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP

4.4.6 EUT OPERATING CONDITION

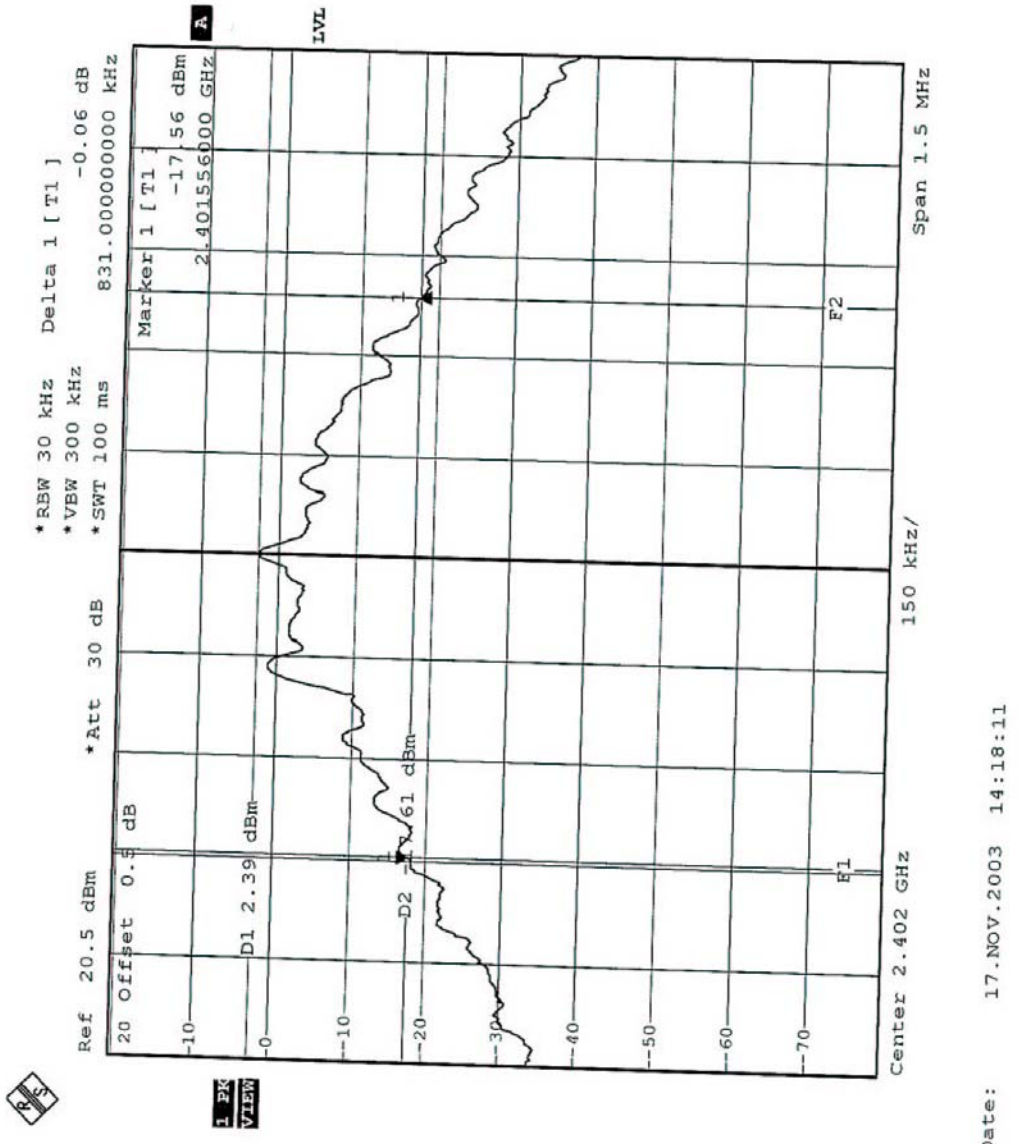
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

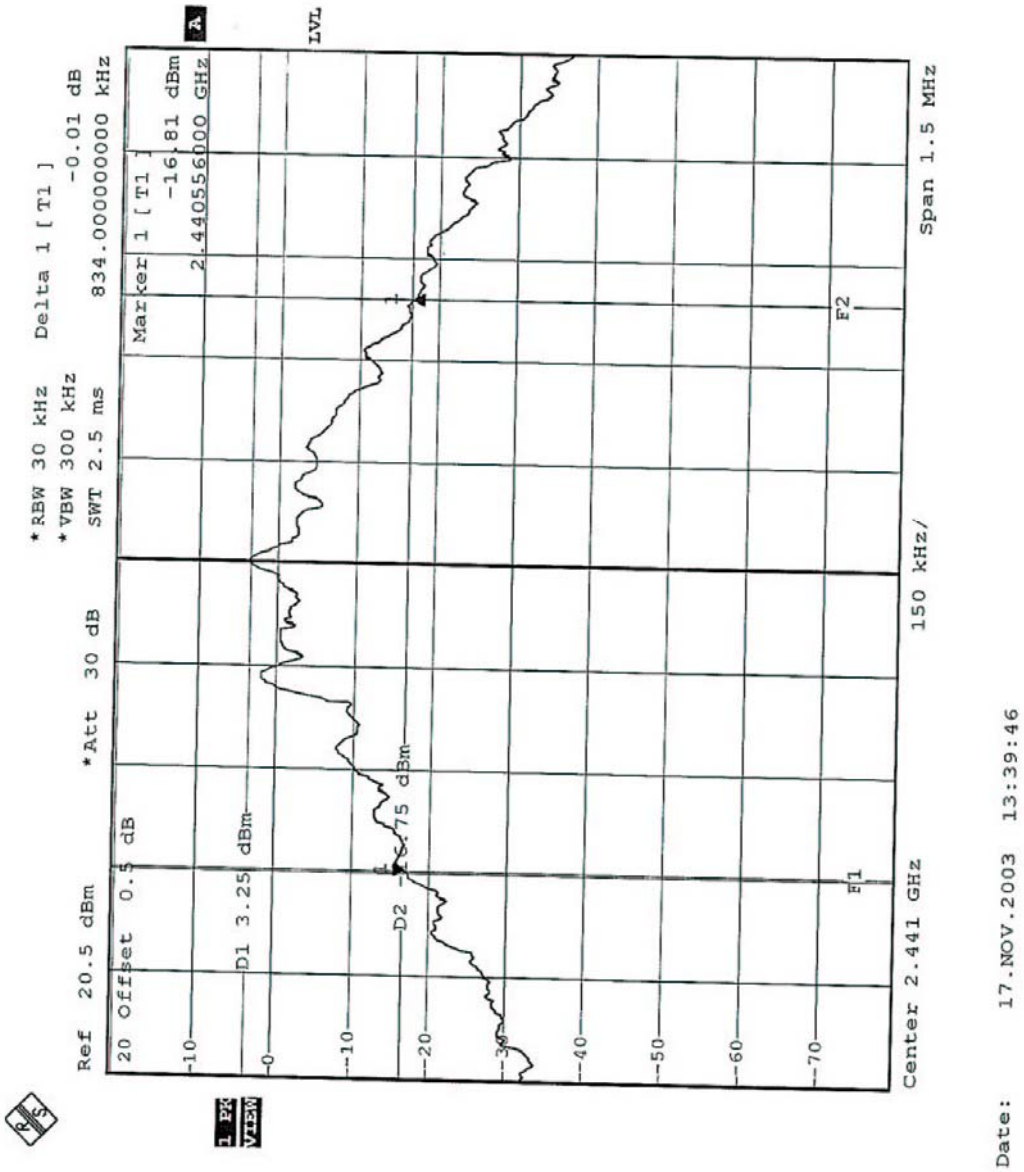
EUT	Personal Digital Assistant	MODEL	HC02U (with Bluetooth Module)
ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 1005hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY: Jamison Chan			

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2402	0.831	1	PASS
39	2441	0.834	1	PASS
78	2480	0.837	1	PASS

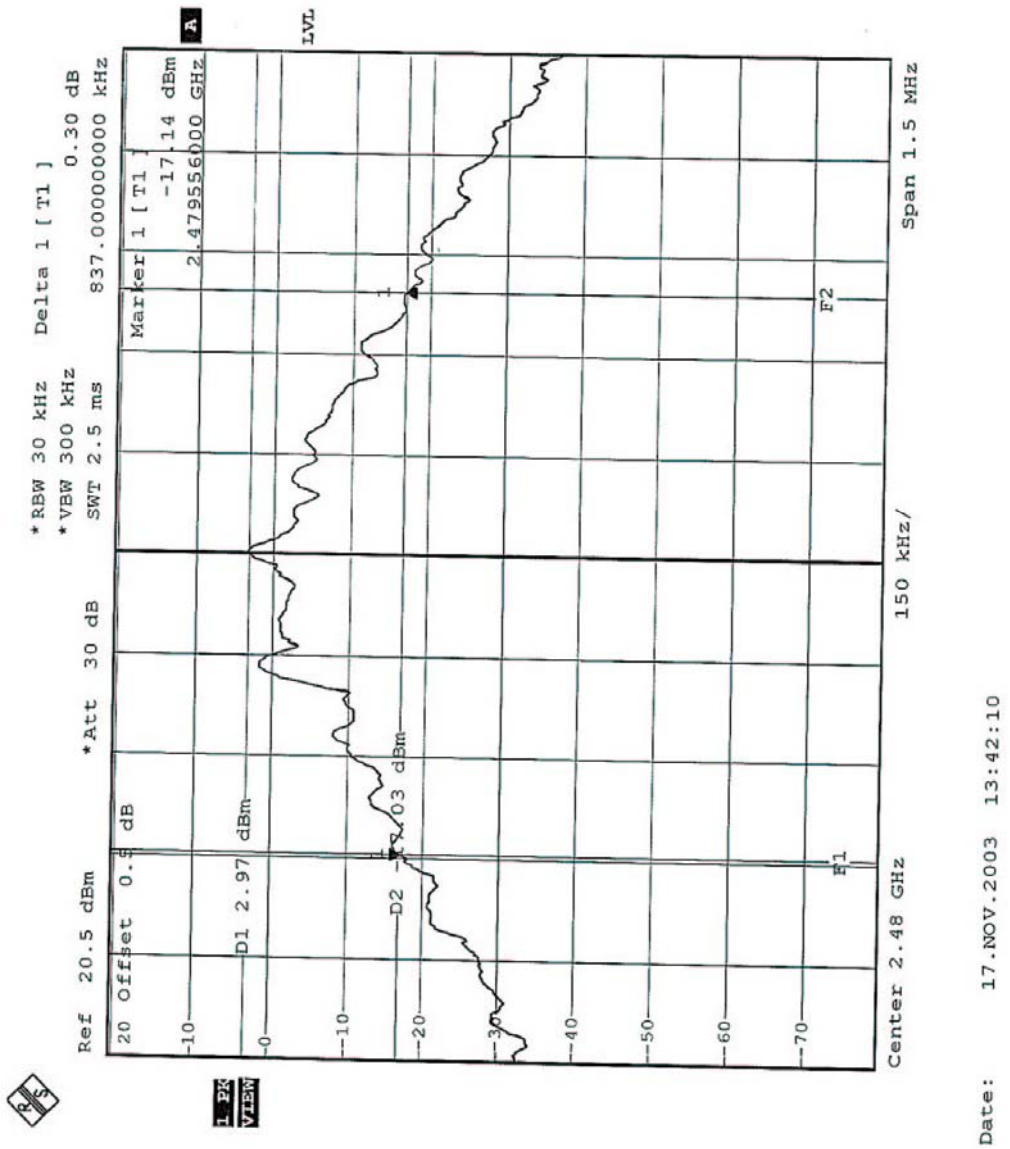
CH0


RBW 30 kHz
VBW 300 kHz
SWT 100 ms
Delta 1 [T1]
-0.06 dB
831.000000000 kHz
Marker 1 [T1]
-17.56 dBm
2.40156000 GHz
Att 30 dB
Ref 20.5 dBm
Offset 0.5 dB
D1 2.39 dBm
D2 -1.61 dBm
F1
F2
Center 2.402 GHz
150 kHz/
Span 1.5 MHz
Date: 17.NOV.2003 14:18:11

CH39


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 30 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
-0.01 dB
834.000000000 kHz
Marker 1 [T1]
-16.81 dBm
2.440556000 GHz
D1 3.25 dBm
D2 -6.75 dBm
F1
F2
Center 2.441 GHz
150 kHz/
Span 1.5 MHz
Date: 17.NOV.2003 13:39:46

CH78


RBW 30 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 1 [T1]
0.30 dB
837.000000000 kHz
Marker 1 [T1]
-17.14 dBm
2.479556000 GHz
Att 30 dB
Ref 20.5 dBm
Offset 0.5 dB
D1 2.97 dBm
D2 -3.03 dBm
Center 2.48 GHz
150 kHz/
Span 1.5 MHz
17.NOV.2003 13:42:10
Date:

4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMITS OF HOPPING CHANNEL SEPARATION

At least 25Khz or 20dB bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.

c. By using the MaxHold function record the separation of two adjacent channels

d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

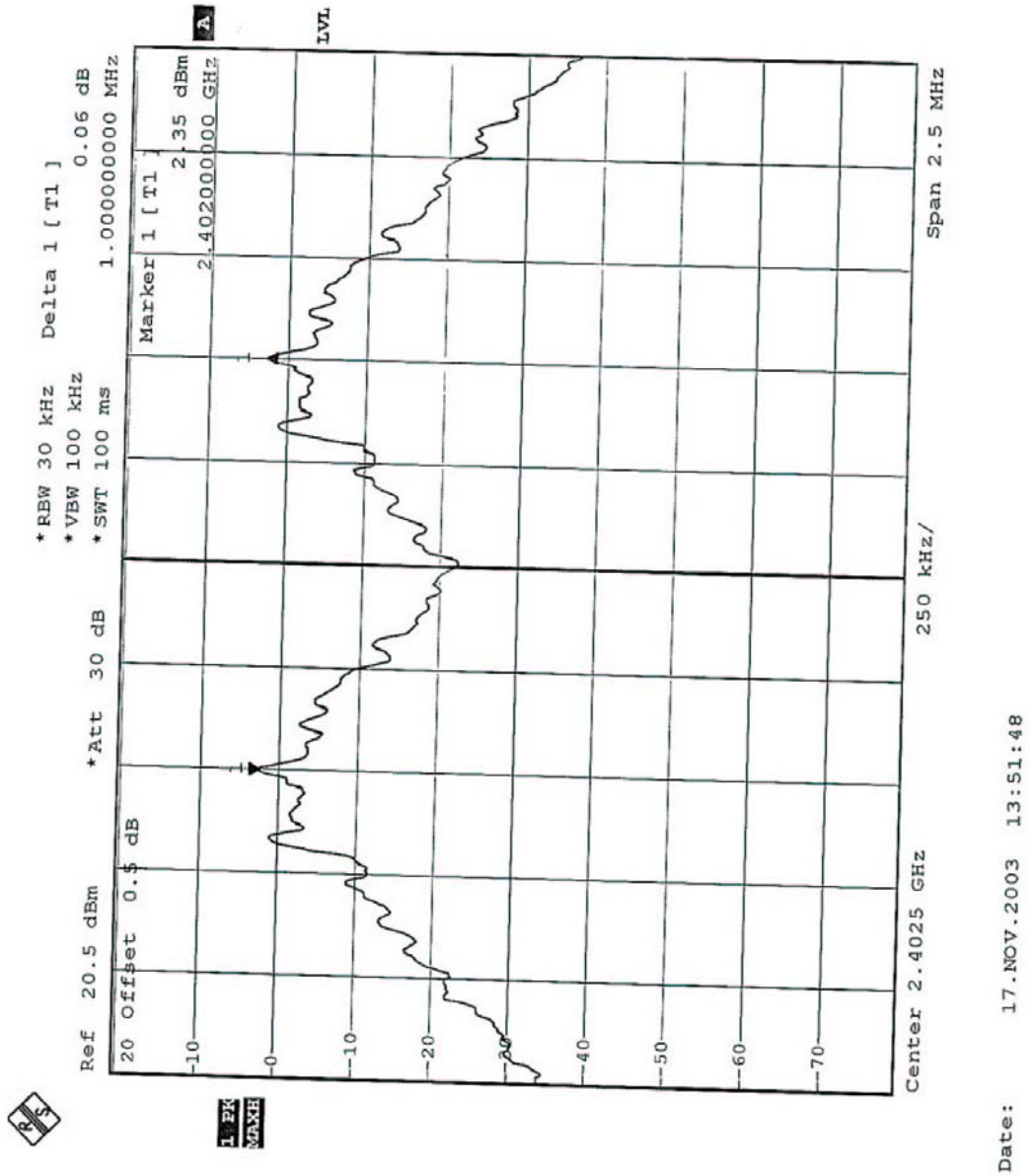
4.5.6 TEST RESULTS

EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
ENVIRONMENTAL CONDITIONS	24deg. C, 62%RH, 1005hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY: Jamison Chan			

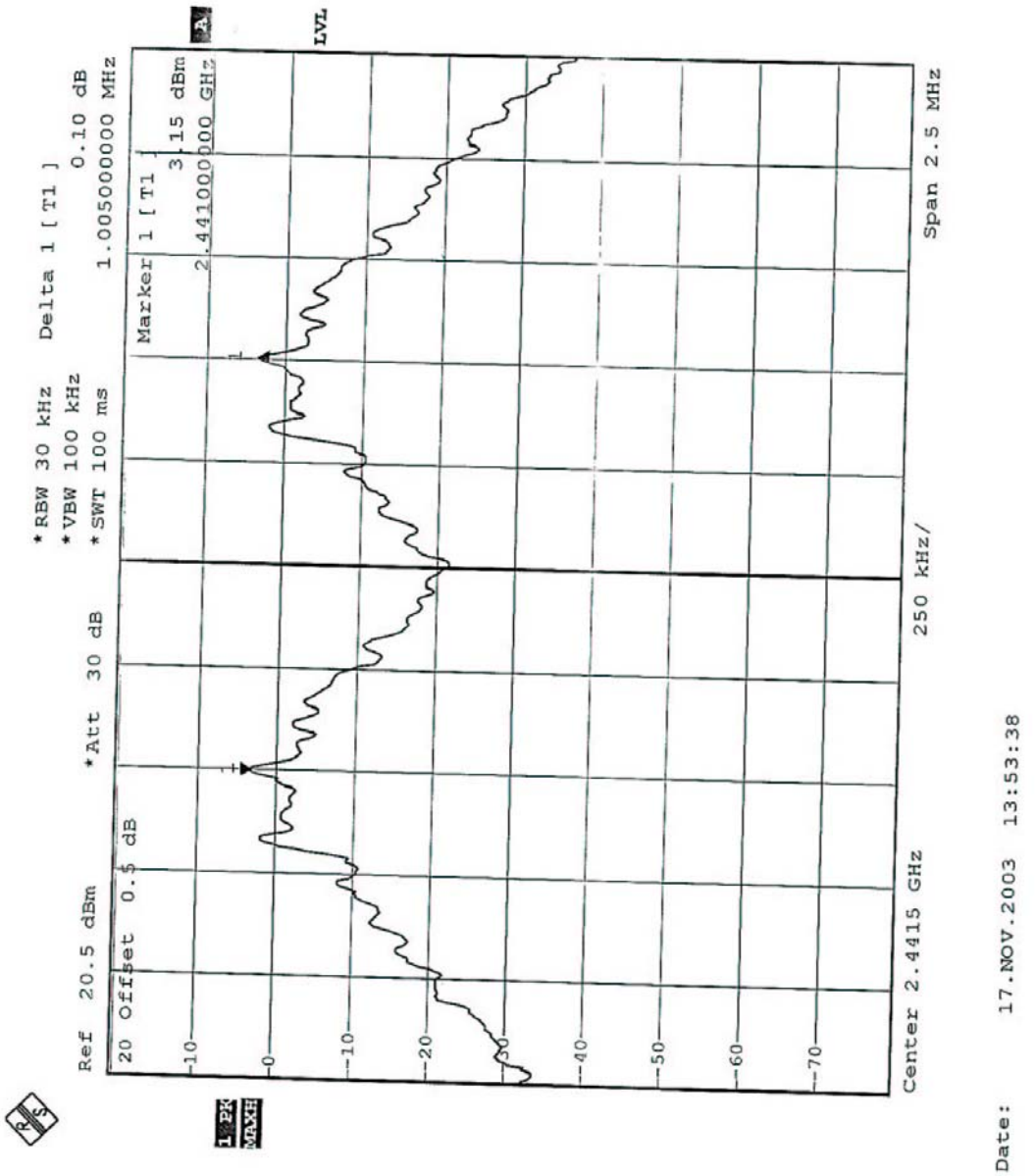
CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2402	1	0.831	PASS
39	2441	1	0.834	PASS
78	2480	1	0.837	PASS

The minimum limit is 20dB bandwidth. Test results please refer to next three pages.

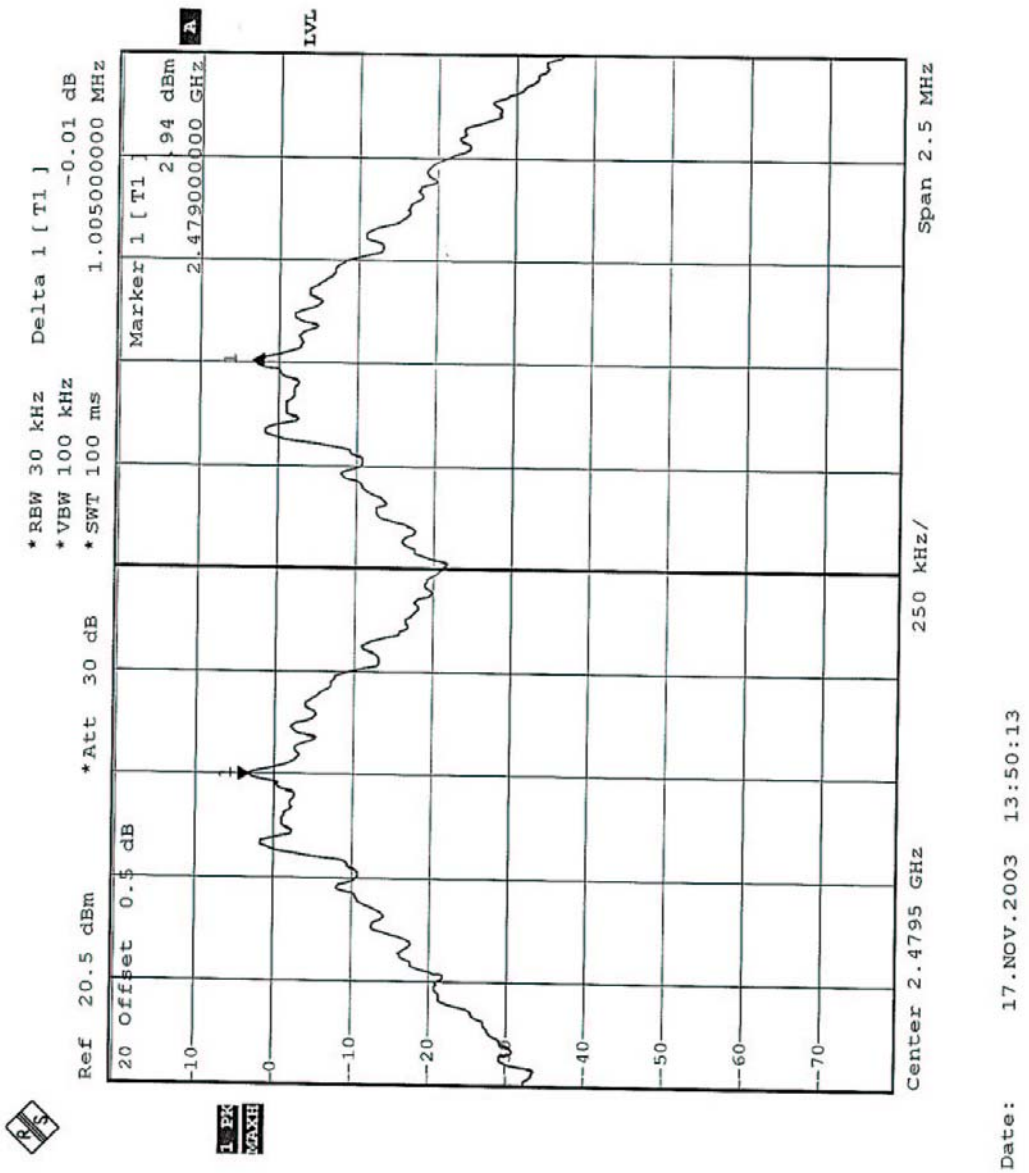
CH0


RBW 30 kHz
VBW 100 kHz
SWT 100 ms
Delta 1 [T1]
0.06 dB
1.000000000 MHz
Marker 1 [T1]
2.35 dBm
2.402000000 GHz
Ref 20.5 dBm
Offset 0.5 dB
Att 30 dB
Center 2.4025 GHz
250 kHz/
Span 2.5 MHz
Date: 17.NOV.2003 13:51:48

CH39


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 30 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 1 [T1]
0.10 dB
1.005000000 MHz
Marker 1 [T1]
3.15 dBm
2.441000000 GHz
LVL
Center 2.4415 GHz
250 kHz/
Span 2.5 MHz
Date: 17.NOV.2003 13:53:38

CH78


*RBW 30 kHz
*VBW 100 kHz
*SWT 100 ms
Delta 1 [T1]
-0.01 dB
1.005000000 MHz
Marker 1 [T1]
2.94 dBm
2.479000000 GHz
Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
LVL
Span 2.5 MHz
250 kHz/
Center 2.4795 GHz
Date: 17.NOV.2003 13:50:13

4.6 MAXIMUM PEAK OUTPUT POWER - USING SPECTRUM ANALYZER

4.6.1 LIMITS OF MAX. PEAK OUTPUT POWER MEASUREMENT

The limit of Maximum Peak Output Power Measurement is 30dBm.

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3 MHz RBW and 3 MHz VBW.

d. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

e. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP

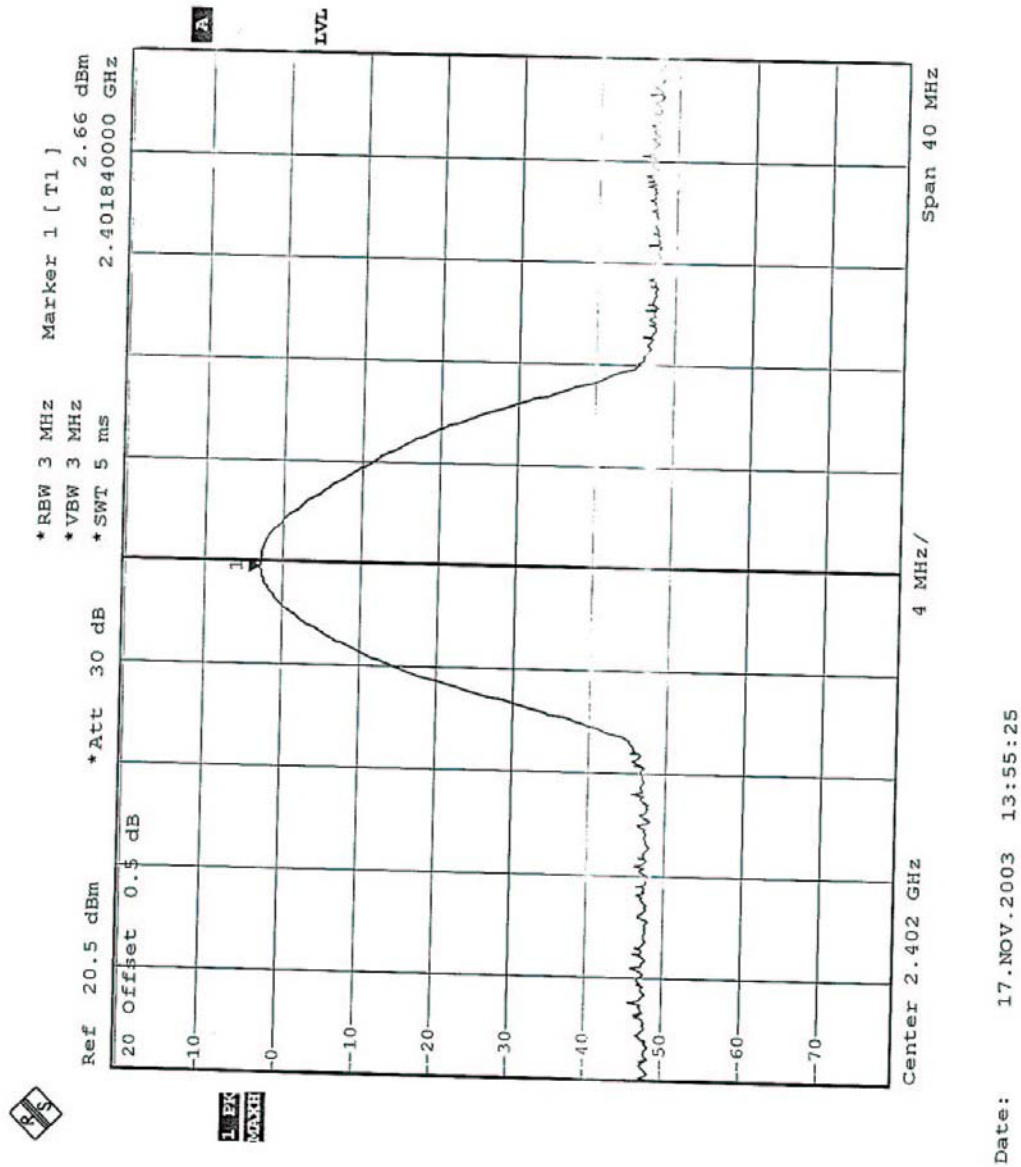
For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.6.6 TEST RESULTS

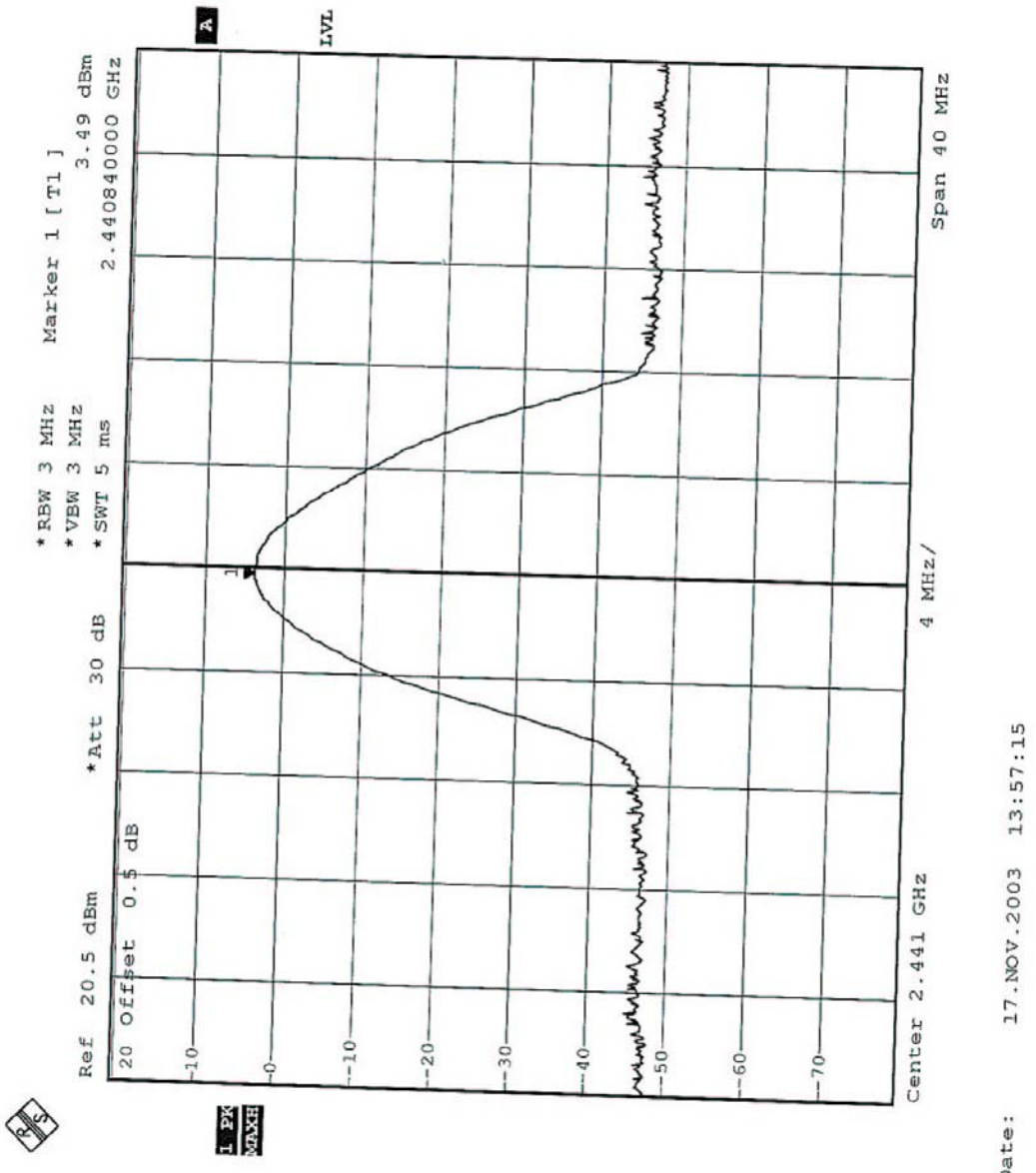
Output Power to Antenna:

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	2.66	30	PASS
39	2441	3.49	30	PASS
78	2480	3.27	30	PASS

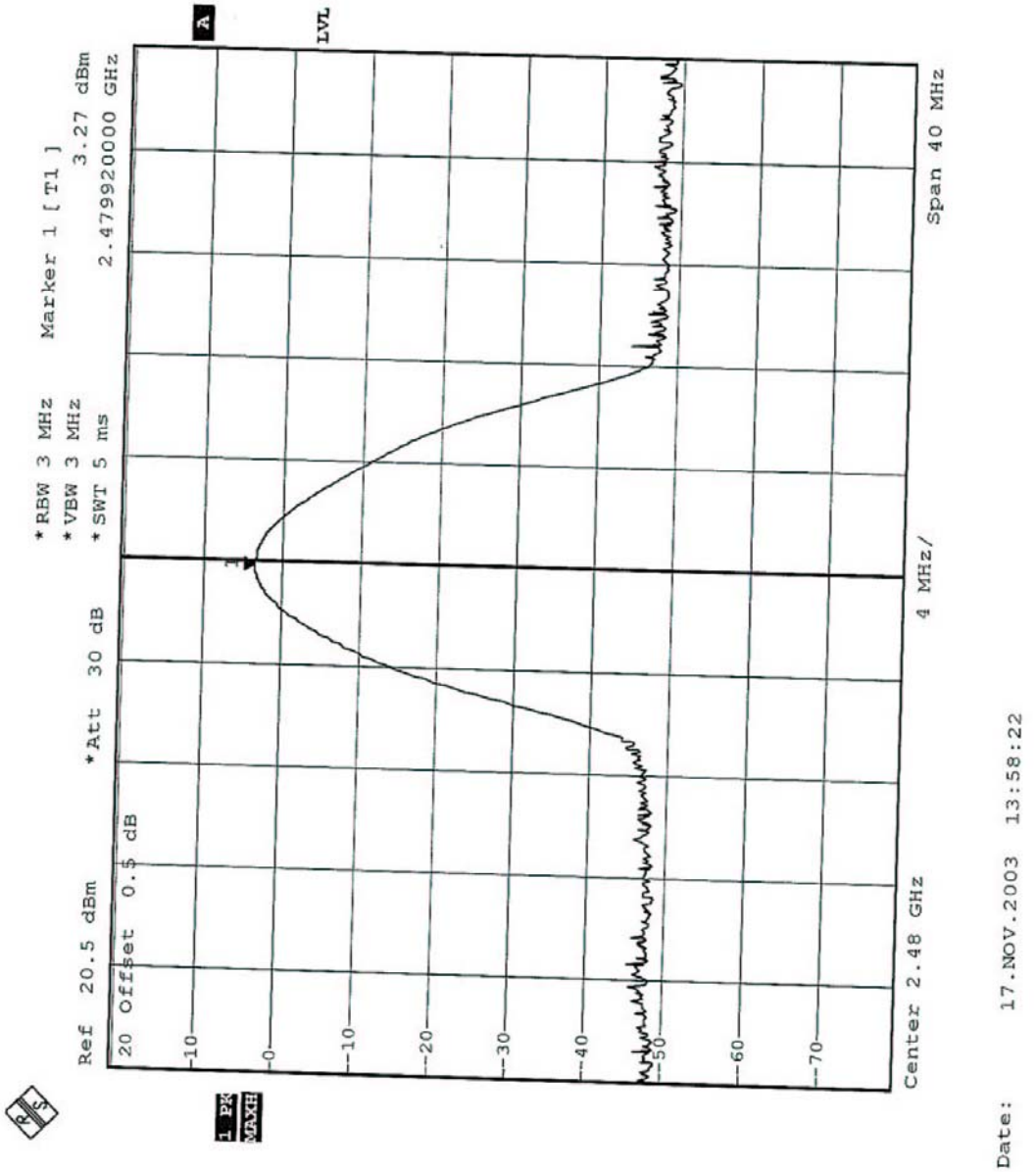
CH0


Ref 20.5 dBm
20 Offset 0.5 dB
*Att 30 dB
*RBW 3 MHz
*VBW 3 MHz
*SWT 5 ms
Marker 1 [T1]
2.66 dBm
2.401840000 GHz
Center 2.402 GHz
4 MHz/
Span 40 MHz
Date: 17.NOV.2003 13:55:25

CH39


A
LVL
Marker 1 [T1]
3.49 dBm
2.440840000 GHz
*RBW 3 MHz
*VBW 3 MHz
*SWT 5 ms
Span 40 MHz
Ref 20.5 dBm
*Att 30 dB
Offset 0.5 dB
4 MHz/
Center 2.441 GHz
1 PK
MAXH
Date: 17.NOV.2003 13:57:15

CH78


A
LVL
Marker 1 [T1]
3.27 dBm
2.479920000 GHz
*RBW 3 MHz
*VBW 3 MHz
*SWT 5 ms
*Att 30 dB
Offset 0.5 dB
Ref 20.5 dBm
Center 2.48 GHz
4 MHz/
Span 40 MHz
1 PK
MAXH
Date: 17.NOV.2003 13:58:22

4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8594E	3911A07465	July 7, 2004
* HP Preamplifier	8447D	2944A10386	Aug. 12, 2004
* HP Preamplifier	8449B	3008A01924	Oct. 12, 2004
* HP Preamplifier	8449B	3008A01638	Oct. 17, 2004
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	Nov. 15, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
SCHAFFNER TEST RECEIVER	SCR 3501	409	Jan. 26, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	July 15, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	June 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23, 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 17, 2004
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 17, 2004

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 10.
5. The VCCI Site Registration No. is R-1625.

4.7.3 TEST PROCEDURE

f. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

g. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

h. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

i. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

j. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

k. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

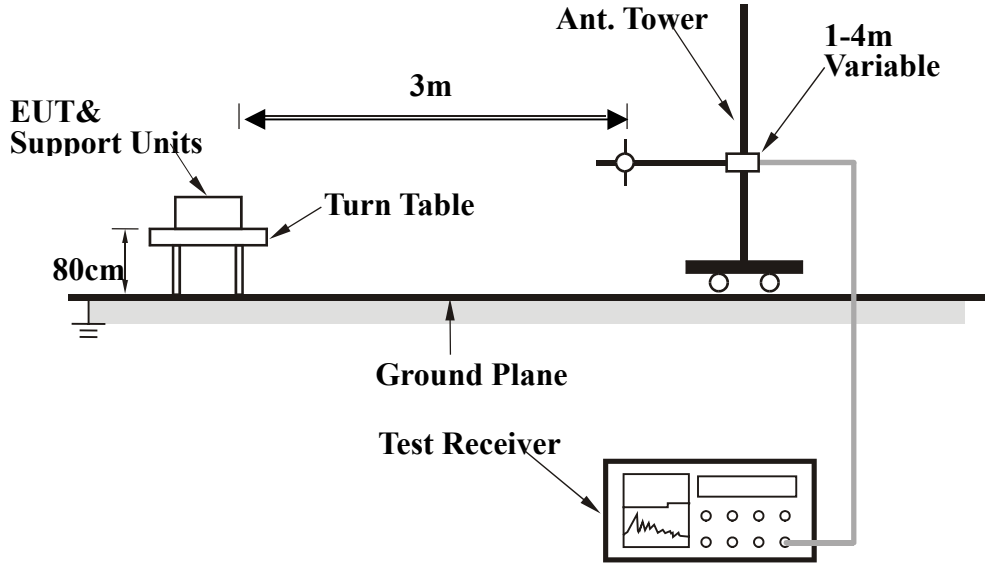
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.7.6 EUT OPERATING CONDITIONS

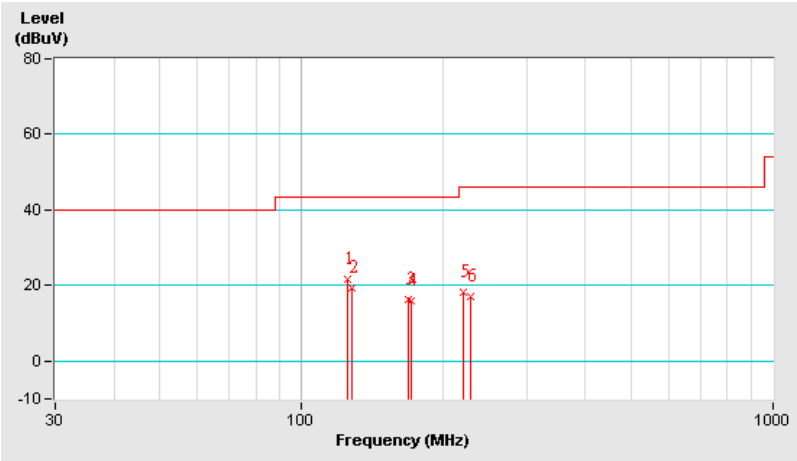
Same as 4.1.6.

4.7.7 TEST RESULTS

EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	124.68	21.61 QP	43.50	-21.89	1.00 H	130	9.15	12.46
2	127.58	19.46 QP	43.50	-24.04	1.00 H	80	6.99	12.47
3	168.05	16.28 QP	43.50	-27.22	4.00 H	324	5.79	10.49
4	171.05	15.90 QP	43.50	-27.60	1.00 H	351	5.52	10.38
5	220.95	18.10 QP	46.00	-27.90	1.00 H	332	6.18	11.92
6	228.93	17.04 QP	46.00	-28.96	1.00 H	219	4.57	12.47

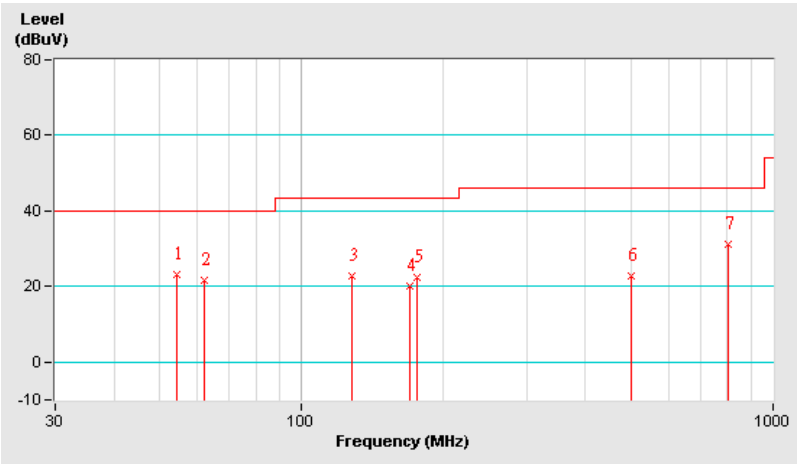
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT	Personal Digital Assistant	**MODEL**	HC02U (with Bluetooth Module)
MODE	Channel 78	**FREQUENCY RANGE**	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	54.20	23.02 QP	40.00	-16.98	1.00 V	18	16.00	7.02
2	61.95	21.78 QP	40.00	-18.22	1.00 V	158	15.93	5.85
3	127.55	22.65 QP	43.50	-20.85	1.00 V	41	10.18	12.47
4	169.88	20.20 QP	43.50	-23.30	4.00 V	118	9.78	10.42
5	175.23	22.30 QP	43.50	-21.20	1.00 V	112	12.06	10.24
6	499.00	22.68 QP	46.00	-23.32	2.13 V	43	0.81	21.87
7	801.25	31.11 QP	46.00	-14.89	2.43 V	36	3.87	27.24

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

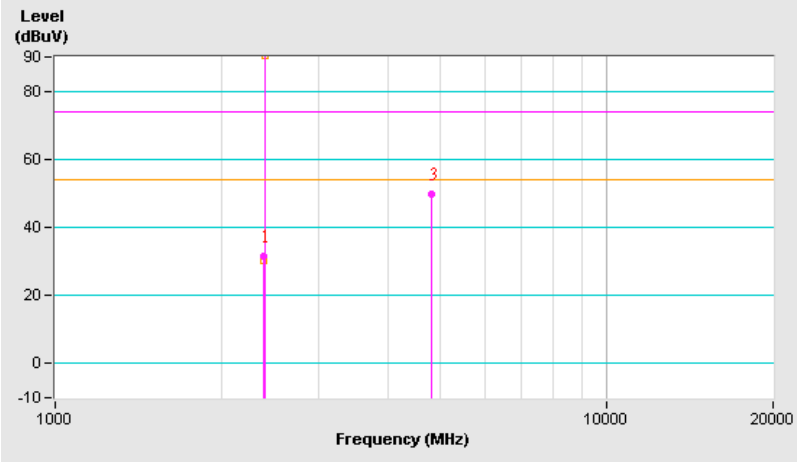


EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 0	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	31.62 PK	74.00	-42.38	1.25 H	188	-1.93	33.55
2	*2402.00	91.62 PK			1.25 H	188	58.00	33.62
2	*2402.00	61.62 AV			1.25 H	188	28.00	33.62
3	4804.00	49.95 PK	74.00	-24.05	1.44 H	360	8.87	41.08

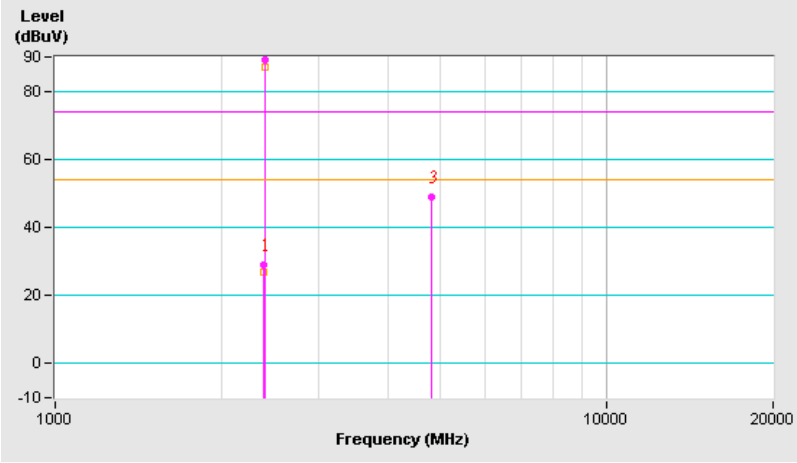
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 0	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	28.95 PK	74.00	-45.05	1.32 V	128	-4.61	33.55
2	*2402.00	88.95 PK			1.25 V	188	55.33	33.62
2	*2402.00	58.95 AV			1.25 V	188	25.33	33.62
3	4804.00	48.90 PK	74.00	-25.10	1.35 V	221	7.82	41.08

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

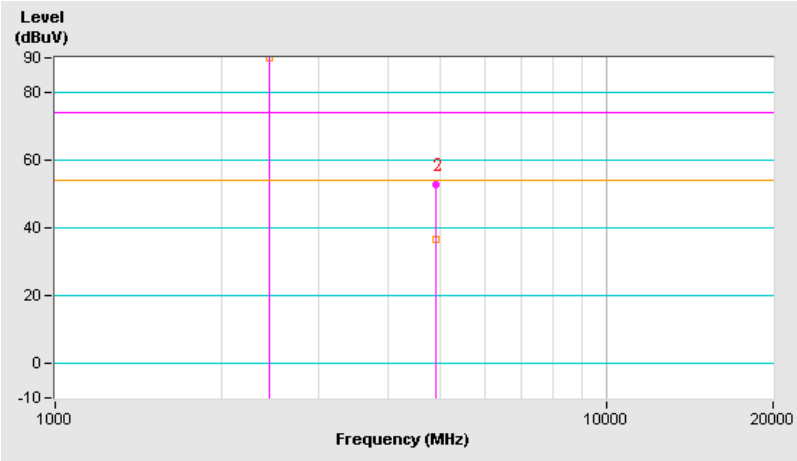


EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 39	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	91.10 PK			1.04 H	213	57.33	33.77
1	*2441.00	61.10 AV			1.04 H	213	27.33	33.77
2	4882.00	52.68 PK	74.00	-21.32	1.27 H	332	11.39	41.28
2	4882.00	22.68 AV	54.00	-31.32	1.27 H	332	-18.61	41.28

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

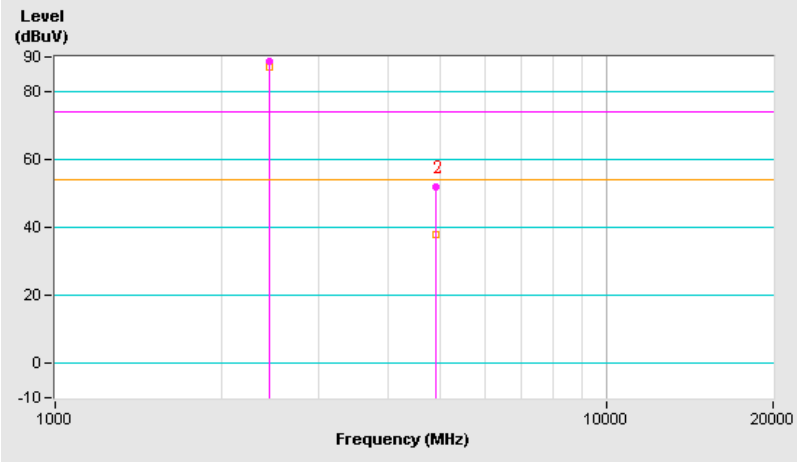


EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 39	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	88.77 PK			1.00 V	216	55.00	33.77
1	*2441.00	58.77 AV			1.00 V	216	25.00	33.77
2	4882.00	51.85 PK	74.00	-22.15	1.22 V	278	10.56	41.28
2	4882.00	21.85 AV	54.00	-32.15	1.22 V	278	-19.44	41.28

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)

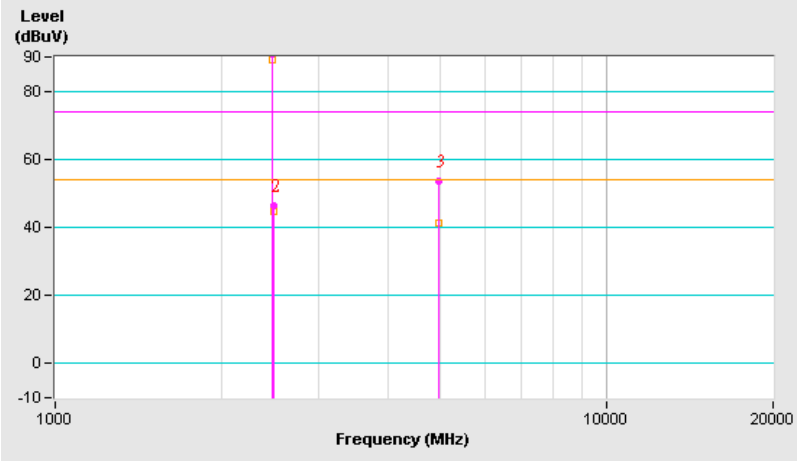


EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 78	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	90.92 PK			1.29 H	182	57.00	33.92
1	*2480.00	60.92 AV			1.29 H	182	27.00	33.92
2	2483.50	46.25 PK	74.00	-27.75	1.29 H	182	12.31	33.94
3	4960.00	53.55 PK	74.00	-20.45	1.25 H	324	12.06	41.49
3	4960.00	23.55 AV	54.00	-30.45	1.25 H	324	-17.94	41.49

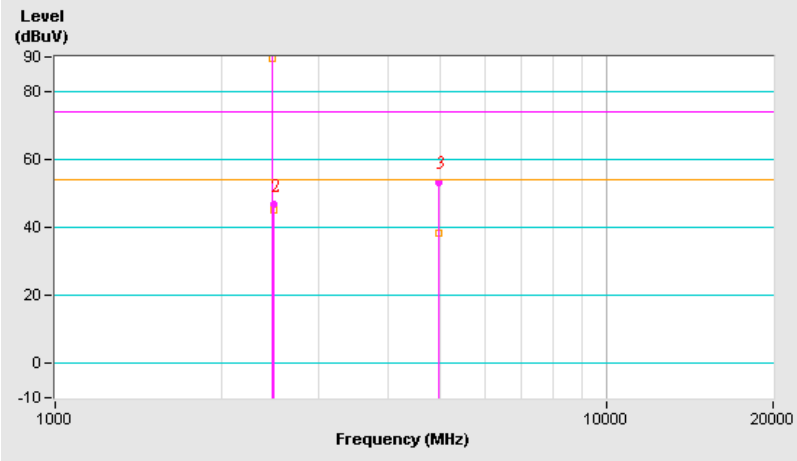
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



EUT	Personal Digital Assistant	**MODEL**	HC02U (with 802.11b Wireless LAN and Bluetooth)
CHANNEL	Channel 78	**FREQUENCY RANGE**	1000MHz – 2483.5MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 1005 hPa	**TESTED BY**: Jun Wu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	91.25 PK			1.00 V	212	57.33	33.92
1	*2480.00	61.25 AV			1.00 V	212	27.83	33.92
2	2483.50	46.58 PK	74.00	-27.42	1.00 V	212	12.64	33.94
3	4960.00	53.05 PK	74.00	-20.95	1.34 V	255	11.56	41.49
3	4960.00	23.05 AV	54.00	-30.95	1.34 V	255	-18.44	41.49

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 274 ms per channel. Therefore the duty cycle be equal to: 20log(3.125/100)= -30dB
7. Average value = peak reading –20log(duty cycle)



4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100035	Apr. 14. 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation.

4.8.5 EUT OPERATING CONDITION

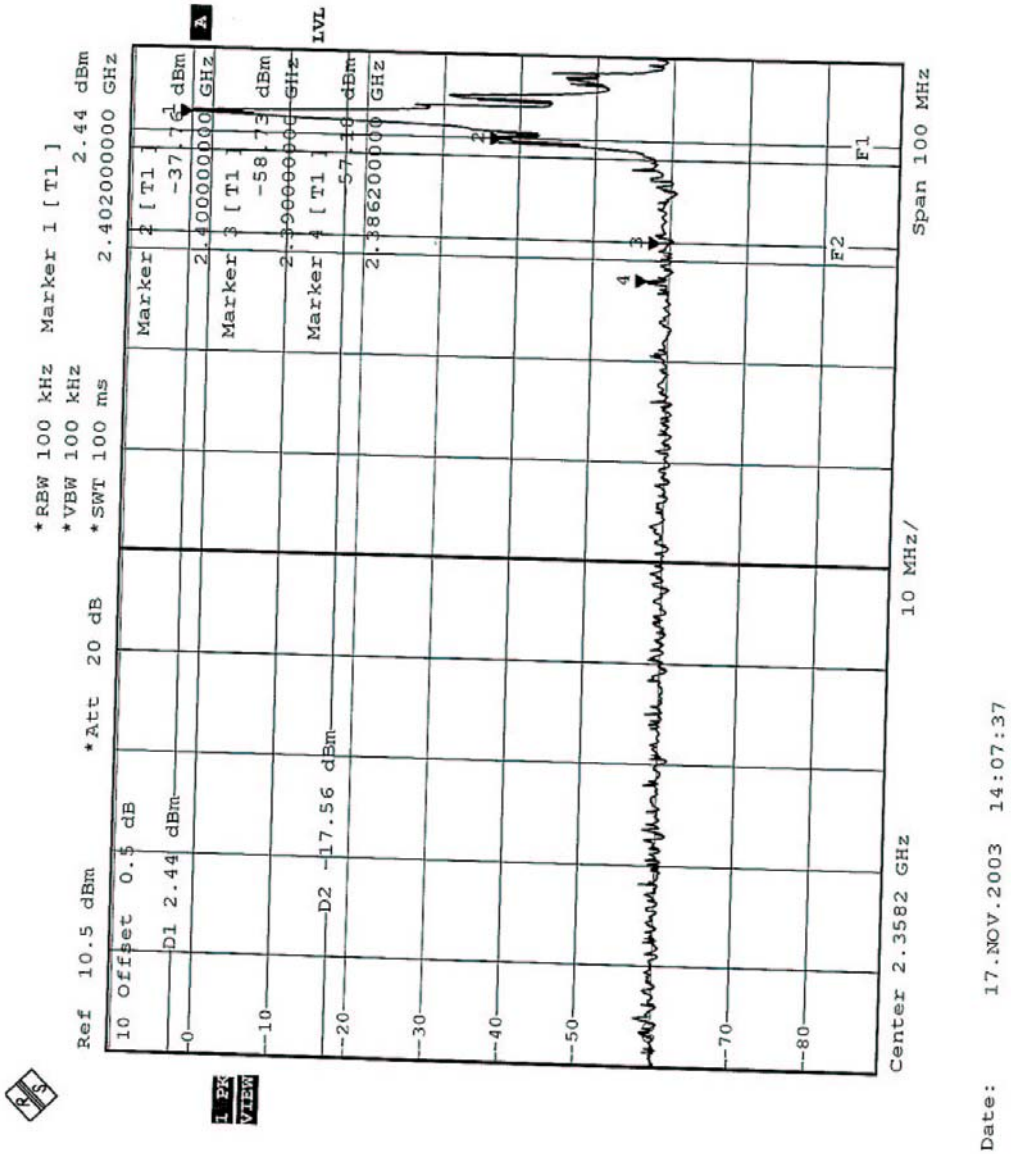
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

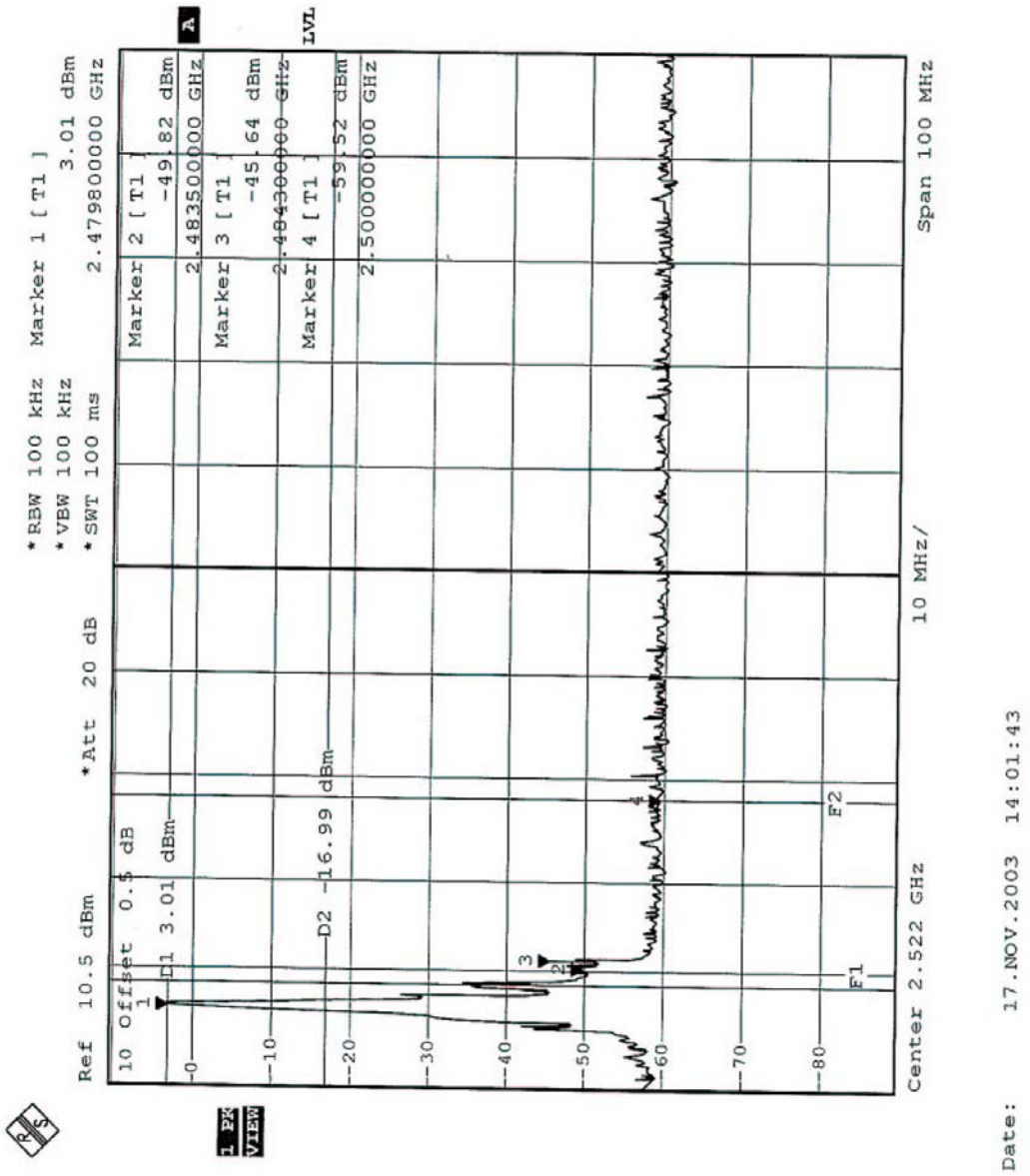
4.8.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

NOTE 1: The band edge emission plot on the following first page shows 59.62dB delta between carrier maximum power and local maximum emission in restrict band (2.3862GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.2.7 is 61.62dBuV/m, so the maximum field strength in restrict band is 61.62-59.62=2dBuV/m which is under 54dBuV/m limit.

NOTE 2: The band edge emission plot on the following second page shows 48.65dB delta between carrier maximum power and local maximum emission in restrict band (2.4843Hz). The emission of carrier strength list in the test result of channel 78 at the item 4.2.7 is 61.25dBuV/m, so the maximum field strength in restrict band is 61.25-48.65=12.60dBuV/m which is under 54dBuV/m limit.


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Marker 1 [T1]
2.44 dBm
2.402000000 GHz
Ref 10.5 dBm
*Att 20 dB
10 Offset 0.5 dB
D1 2.44 dBm
D2 -17.56 dBm
Marker 2 [T1]
-37.76 dBm
2.400000000 GHz
Marker 3 [T1]
-58.73 dBm
2.390000000 GHz
Marker 4 [T1]
-57.10 dBm
2.386200000 GHz
LVL
A
1 PK VIEW
Center 2.3582 GHz
10 MHz/
Span 100 MHz
F1
F2
Date: 17.NOV.2003 14:07:37


*RBW 100 kHz
*VBW 100 kHz
*SWT 100 ms
Marker 1 [T1]
3.01 dBm
2.479800000 GHz
*Att 20 dB
Ref 10.5 dBm
10 Offset 0.5 dB
D1 3.01 dBm
D2 -16.99 dBm
Marker 2 [T1 -49.82 dBm 2.483500000 GHz
Marker 3 [T1 -45.64 dBm 2.484300000 GHz
Marker 4 [T1 -59.52 dBm 2.500000000 GHz
A
LVL
1 PK VIEW
Center 2.522 GHz
10 MHz/
Span 100 MHz
F1
F2
Date: 17.NOV.2003 14:01:43

4.9 ANTENNA REQUIREMENT

4.9.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

For Bluetooth, the antenna type used in this product is single band antenna in IFA type with U.FL connector from Hirose Corp. The maximum Gain of this antenna is 3.19dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST

6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	CNLA, BSMI

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Lin Kou EMC Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

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Tel: 886-3-3270910
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Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.